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JOURNAL

OF

THE PROCEEDINGS

OF

THE LINNEAN SOCIETY.

ZOOLOGY.

VOL. I.

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JOURNAL OF THE PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

On the Kātēpo, a supposed poisonous Spider of New Zealand ;
extracted from a letter addressed by THOMAS SHEARMAN
RALPH, Esq., A.L.S., to R. Kippist, Esq., Libr. L.S., dated
Wellington, New Zealand, 18th April, 1855.

[Read November 6th, 1855.]

THIS spider is chiefly, if not only, met with under the low scrubby bushes which exist on the sand-hills along the shore ; and is frequent in the neighbourhood of Otaki. They build their retreat under the branches of the shrubs close to the ground, and make no regular net, but irregular galleries of webbing, entangled with bits of leaves and minute fragments of wood ; and judging from the remains of beetles' wings, I suppose that their principal food consists of insects of that class. Their nests are round, and contain from fifty to sixty eggs : when first hatched, the young present a very different appearance from the full-grown spiders. I have several times kept them in a bottle ; but although fed with sand flies, and occasionally with fine fragments of raw beef, on which I have seen them occupied, they entangle each other and so get destroyed : otherwise I have not been able to obtain casts of their skins. At this period they are white, dotted with black spots, there being about six pairs of black dots along the body ; and the legs are banded with black marks. The next stage, or

at least one larger in size, has the body white or grey, with a beautiful orange-coloured band along the whole length of the back. This band is angulated, consisting of a series of squares, placed obliquely and connected at their angles with an edging of white; and on each side of it are two smaller black ones similarly constituted; the limbs are banded with brownish marks. The full-grown spider is of a beautiful black; the golden band is exchanged for an orange-red one of the same shape; but as the successive coats are thrown off, it ceases to be marked at the thoracic end, being visible only towards the tail. The body of the female is larger and rounder. This spider is reputed to be venomous by the natives, who will not touch them on any account; but how far this is really the case I am scarcely able to determine, having only met with one European, who affirmed that he had been bitten by one, and had had an inflamed leg in consequence; but his belief in the cause of this inflammation was founded on native authority. I have hitherto only been able myself to make with them the following experiment:—I placed a lively unhurt mouse in a glass bottle with a fine Katapo, and by dint of shaking the bottle, at length induced the spider to bite the mouse in two places, first on the tail, and secondly on the paw, which latter injury the mouse resented by biting the spider and killing it. The mouse was kept supplied with air, and was found dead within eighteen hours, its body being wet, as though a quantity of urine had been discharged over it. The bottle was quite dry and clear before the spider and mouse were placed in it.

Remarks on some Habits of *Argyroneta aquatica*. By THOMAS BELL, Esq., Pres. L.S.

[Read November 20th, 1855.]

IN consequence of some observations which were made by Mr. Gosse at the last Meeting of the Society, in which he stated his opinion that the *Argyroneta* never fills its bell with air brought from the surface, but that it becomes gradually filled with oxygen evolved from the vegetation casually going on beneath the web, I immediately obtained several specimens of the animal for the purpose of setting the question at rest, and the following are the results of my observations:—

No. 1. Placed in an upright cylindrical vessel of water, in which was a rootless plant of *Stratiotes*, on the afternoon of Nov. 14. By the morning it had constructed a very perfect oval cell filled

with air, about the size of an acorn. In this it has remained stationary up to the present time.

No. 2.—Nov. 15. In another similar vessel, also furnished with a plant of *Stratiotes*, I placed six *Argyronetæ*. The one now referred to began to weave its beautiful web about five o'clock in the afternoon. After much preliminary preparation, it ascended to the surface, and obtained a bubble of air, with which it immediately and quickly descended, and the bubble was disengaged from the body, and left in connexion with the web. As the nest was, on one side, in contact with the glass, enclosed in an angle formed by two leaves of the *Stratiotes*, I could easily observe all its movements. Presently it ascended again and brought down another bubble which was similarly deposited. In this way no less than fourteen journeys were performed, sometimes two or three very quickly one after another, at other times with a considerable interval between them, during which the little animal was employed in extending and giving shape to the beautiful transparent bell, getting into it, pushing it out at one place, and rounding it at another, and strengthening its attachment to the supports. At length it seemed to be satisfied with its dimensions, when it crept into it and settled itself to rest with the head downwards. The cell was now the size and nearly the form of half an acorn cut transversely, the smaller and rounded part being uppermost.

No. 3. The only difference between the movements of this and the former was, that it was rather quicker in forming its cell. In neither vessel was there a single bubble of oxygen evolved by the plant.

The manner in which the animal possesses itself of the bubble of air is very curious, and, as far as I know, has never been exactly described. It ascends to the surface slowly, assisted by a thread attached to the leaf or other support below, and to the surface of the water. As soon as it comes near the surface, it turns with the extremity of the abdomen upwards, and exposes a portion of the body to the air for an instant; then with a jerk it snatches as it were a bubble of air, which is not only attached to the hairs which cover the abdomen, but is held on by the two hinder legs, which are crossed at an acute angle near their extremity; this crossing of the legs taking place at the instant the bubble is seized. The little creature then descends more rapidly, and regains its cell, always by the same route, turns the abdomen within it, and disengages the bubble.

No. 4. Several of them, when I received them, had the hair on

the abdomen wetted, and I placed them on some blotting-paper until they were dry. On returning them to the water, two remained underneath a floating piece of cork, and the hair being now dry retained the pellicle of air which is ordinarily observed. One of the two came out of the water, attached the cork to the glass, and wove a web against the latter, against which it rested about a quarter of an inch above the surface of the water. After remaining there about two days, it resumed its aquatic habits, and like all the others formed its winter habitation. I have now no fewer than ten which have formed their cells, in which they are perfectly at rest, and evidently hibernating.

The general habits of this interesting animal are well described by De Lignac, De Geer, Walckenaer, and others, and an excellent *résumé* of the whole observations is given by the latter author, in his 'Histoire Naturelle des Insectes Aptères.'

Catalogue of the Dipterous Insects collected at Singapore and Malacca by Mr. A. R. WALLACE, with Descriptions of New Species. By FRANCIS WALKER, Esq., F.L.S.

[Read January 15th, 1856.]

MR. A. R. WALLACE, so well known for his natural-history researches in the valley of the Amazons, and for the extensive and valuable collections sent home by him from that portion of South America, has now turned his attention to the eastern world, and is actively investigating the natural history of the East Indian Islands, after having spent some months on the Malay Peninsula. A large portion of Mr. Wallace's entomological collections pass into my hands, and being desirous of making his labours scientifically useful, I have requested Mr. F. Walker, who has such an intimate knowledge of the insects belonging to the order *Diptera*, to draw up the following catalogue of the dipterous insects discovered by Mr. Wallace at Singapore and Malacca. My object in so doing is to establish a kind of starting-point for tracing hereafter, when all Mr. Wallace's collections shall have come to hand, the geographical distribution of the *Diptera* in the very interesting portion of the globe which Mr. Wallace is now investigating with such indefatigable zeal. Singapore and Malacca, at the extremity of the Malay Peninsula, are well placed for carrying out the purpose I have in view, being in connexion northwards through the

Burman Empire with the expanded continent of Asia, and southwards in close approximation with that archipelago of splendid islands which run in a chain to the north coast of Australia, and send off a branch northwards through the Philippine Islands to the coast of China, touching there again the mainland of Asia. The present catalogue will be followed very shortly by one detailing the species of *Diptera* discovered in Borneo, the materials for which are now nearly all in this country, and other catalogues will follow until Mr. Wallace's discoveries in the *Diptera* are exhausted. That Mr. Wallace will be able to visit all the islands of the Indian Archipelago is not to be expected, but still, his plan of exploring those which have been but little examined in a natural-history point of view, will open up a large amount of information, which, when combined with the labours of other naturalists who have been working in the same districts, will give sufficient facts for laying down some laws on the geographical distribution of the insects belonging to the Order which forms the subject of the following catalogue. The specimens collected at Singapore and Malacca were taken during the six months commencing with May and terminating with October. Where the altitude of the locality above the level of the sea of any species is known, this will be found noted in the proper place. Figures will be given to illustrate new genera or any very remarkable species.

WILLIAM WILSON SAUNDERS.

14th January, 1856.

Fam. BIBIONIDÆ, *Haliday*.

Gen. PLECIA, *Hoffmansegg*.

1. PLECIA DORSALIS, n. s., mas et fœm. Atræ, thorace rufo, alis nigricantibus.

Male and female. Deep black. Thorax bright pale red. Wings blackish.

Length of the body $2\frac{1}{2}$ – $3\frac{1}{2}$ lines; of the wings 7–8 lines.

The totally red thorax of this species distinguishes it from *P. fulvicollis*, Wied., and from *P. ignicollis*, Walk.

Singapore and Mount Ophir.

Fam. CULICIDÆ, *Haliday*.

Gen. CULEX, *Linn.*

2. *Culex splendens*, *Wied. Auss. Zweifl.* i. 3. 3.

Singapore. Inhabits also Java.

3. *Culex fuscus*, *Wied. Auss. Zweifl.* i. 6. 9.

Malacca. Inhabits also Hindostan.

4. *CULEX ANNULIPES*, n. s., fœm. Obscurè fuscus, thoracis abdominisque lateribus albo-punctatis, pedibus albo-cinctis, alis sublimpidis venis fusco-ciliatis.

Female. Dark brown. Sides of the thorax and of the abdomen with minute white dots. Legs with numerous white bands. Wings nearly limpid; veins brown, ciliated. Length of the body $2\frac{1}{2}$ lines; of the wings 4 lines. Singapore. (Jungle.)

Fam. TIPULIDÆ.

Gen. LIMNOBIA, *Meigen*.

Div. I. *Meig. Zweifl.* i. 131. pl. 5. f. 5.

5. *LIMNOBIA LEUCOTELUS*, n. s., mas. Atra, alis nigricantibus, maculâ discali limpidâ, margine postico subcinereo, apice albo.

Male. Deep black. Wings blackish, with a discal limpid spot; posterior border slightly greyish for rather more than half the length from the base; tips white. Length of the body 6 lines; of the wings 12 lines.

Singapore.

6. *LIMNOBIA PLECTOIDES*, n. s., fœm. Atra, thorace pallidè rufo, alis nigricantibus.

Female. Deep black. Thorax pale red. Wings blackish. Length of the body 7 lines; of the wings 12 lines.

Singapore.

Div. L. *Meig. Zweifl.* i. 132. pl. 5. f. 4.

The structure of the wing-veins in the above division is almost, but not quite, identical with that of the following species.

7. *LIMNOBIA DICHROA*, n. s., fœm. Atra, antennis ferrugineis basi apiceque nigris, abdomine luteo, basi fasciâque latissimâ posticâ nigris, pedibus testaceis, femoribus tibiisque apice tarsisque nigris, alis fusciscentibus costâ testaceâ.

Female. Deep black. Antennæ ferruginous, black at the base and at the tips. Abdomen luteous, black at the base and with a very broad black band beyond the middle. Legs testaceous; tarsi and tips of the femora and of the tibiae black. Wings brownish, testaceous at the base and along the costa. Length of the body 9 lines; of the wings 16 lines.

Mount Ophir.

Gen. CTENOPHORA, *Fabr.*

8. *CTENOPHORA CHRYSOPHILA*, n. s., fœm. Lutea, abdominis apice nigro, pedibus pallidè luteis, femoribus apice tibiis tarsisque nigris, alis flavescenscentibus apice nigris margine postico interruptè nigricante.

Female. Bright luteous. Abdomen black towards the tip. Legs pale luteous; tibiae, tarsi, and tips of the femora black. Wings yellowish, black towards the tips, irregularly and interruptedly blackish along the posterior border. Length of the body 8 lines; of the wings 16 lines.

Singapore.

Fam. STRATIOMIDÆ, *Haliday*.Gen. PTILOCERA, *Wied.*

9. *Ptilocera quadridentata*, *Fabr. Syst. Antl.* 86. 33. (Stratiomys.)

Malacca and Singapore. Inhabits also Java, Sumatra, and the Philippine Islands.

Gen. STRATIOMYS, *Geoffroy*.

10. *Stratiomys Lutatius*, *Walk. Cat. Dipt.* pt. 3. 532.

Malacca.

Gen. CLITELLARIA, *Meigen*.

11. *Clitellaria bivittata*, *Fabr. Syst. Antl.* 79. 5. (Stratiomys.)

Singapore. Inhabits also Java and Sumatra.

12. *Clitellaria varia*, *Walk. Cat. Dipt.* 2nd Ser. pt. 1. 63.

Malacca. Inhabits also Java.

13. *CLITELLARIA FLAVICEPS*, n. s., fem. Nigra, capite flavo, thorace cinereo trivittato, scutello bispinoso, abdomine purpureo-cyaneo, alis cinereis apud costam nigricantibus.

Female. Black. Head pale yellow. Antennæ a little shorter than the thorax. Thorax a little narrower in front, with three grey stripes. Scutellum with two stout spines. Abdomen purplish blue; disk beneath hoary. Wings dark grey, blackish along the costa; veins black. Halteres whitish. *Var. β*. Smaller. Spines of the scutellum and tarsi whitish, with black tips. Length of the body $2\frac{1}{2}$ – $3\frac{1}{2}$ lines; of the wings 5–7 lines.

Singapore.

Gen. CYCLOGASTER, *Macquart*.

14. *CYCLOGASTER RADIANUS*, n. s., fem. Nigra, capite nitido, antennis fulvis aristâ albidâ, thorace cinereo radiis quinque nigris, abdomine subrotundo, tarsis albidis, alis cinereis.

Female. Black, rather broad. Head shining. Antennæ tawny, with a pubescent white arista which is as long as the preceding part. Thorax cinereous, with five black rays, three in front and one on each side. Scutellum obconical, prominent. Abdomen nearly round, cinereous, with three rows of black spots. Knees and the adjoining part tawny; tarsi whitish. Wings limpid; veins testaceous. Halteres whitish. Length of the body 3 lines; of the wings 5 lines.

Singapore.

Gen. PHYLLOPHORA, *Macquart*.

15. *PHYLLOPHORA ANGUSTA*, n. s., mas. Nigra, angusta, sublinearis, antennis setaceis basi fulvis, thorace producto cinereo-bivittato, pedibus testaceis, femoribus posterioribus suprâ piccis, alis cinereis, venis halteribusque fuscis.

Male. Black, narrow, nearly linear. Antennæ setaceous, tawny towards the base, a little longer than the head. Thorax elongated, with two cinereous stripes. Scutellum with four very minute spines. Abdomen hardly broader

and not longer than the thorax. Legs testaceous; posterior femora piecous above. Wings cinereous; veins and halteres brown. Length of the body $2\frac{1}{2}$ lines; of the wings $1\frac{1}{2}$ lines.

Singapore.

Gen. EUDMETA, *Wied.*

16. *Eudmeta marginata*, *Fabr. Syst. Anth.* 63. 3. (Hermetia.)

Singapore. Inhabits also Java, Sumatra, and Hindostan.

Gen. MASSICYTA, n. g. (*Plate I. fig. 1.*)

Corpus longiusculum, sat angustum. *Caput* transversum, breve, thorace vix latius. *Antennæ* graciles, thorace paullo breviores; articulus 1^{us} linearis; 2^{us} longi-fusiformis, 1^o vix longior; 3^{us} acuminatus, minimus. *Thorax* longi-ellipticus. *Abdomen* obelavatum, subpetiolatum, thorace plus duplo longius. *Pedes* graciles. *Alæ* elongatæ, sat angustæ.

Body rather long and narrow. Head transverse, short, very little broader than the thorax. Antennæ slender, a little shorter than the thorax; 1st joint linear; 2nd elongate fusiform, very little longer than the 1st; 3rd acuminated, very minute. Thorax elongate elliptical. Abdomen obelavate, subpetiolated, a little more than twice the length of the thorax. Legs slender. Wings rather long and narrow; mediastinal, subcostal, radial and cubital veins, and median veinlet of the usual structure; 1st, 2nd and 4th externo-medial veins complete; 3rd abbreviated; subanal joining the anal at some distance from the border; discal areolet irregularly hexagonal, elongated, narrower towards the tip of the wing.

17. *MASSICYTA BICOLOR*, n. s., fem. Nigra, antennis basi testaceis apice albis, pectore scutelloque flavis, illo nigro binaurato, abdomine testaceo fasciato, pedibus flavis, femoribus anterioribus tibiisque posticis fusco fasciatis, femoribus posticis nigris, alis cinereis, apud costam subluridis.

Female. Black, shining, with testaceous pubescence. Mouth testaceous. Antennæ testaceous towards the base, white at the tips. Pectus and scutellum yellow, the former with a large black spot on each side. Abdomen with testaceous bands. Legs yellow; hind femora black; anterior femora and hind tibiae with brown bands. Wings grey, with a slight lurid tinge along the costa; veins black. Halteres pale yellow. Length of the body 6-7 lines; of the wings 10-12 lines.

Singapore.

Gen. SARGUS, *Fabr.*

18. *Sargus longipennis*, *Wied. Auss. Zweifl.* ii. 34. 11.

Malacca. Inhabits also Java.

19. *SARGUS LURIDUS*, n. s., mas. Ferrugineus, capite pectoreque testaceis, antennis fulvis, abdominis segmentis testaceo-fasciatis, apice nigro, pedibus testaceis, tibiis posticis apice nigris, tarsis posticis nigris apice albidis, alis luridis apice fuscis.

Male. Ferruginous. Head and pectus testaceous. Antennæ tawny. Abdomen black towards the tip; a testaceous band on the hind border of each

segment. Legs testaceous; hind tibiæ black towards the tips; hind tarsi black, with whitish tips. Wings lurid, brown towards the tips; veins brown. Halteres testaceous. Length of the body 7 lines; of the wings 14 lines.

Singapore.

Fam. TABANIDÆ, *Leach.*

Gen. TABANUS, *Linn.*

20. *Tabanus univentrìs*, *Walk. Cat. Dipt.* pt. 1. 151.

The description in the above reference will not well apply to the two following varieties of this species.

Var. 1. Female. Brown. Head testaceous in front and beneath. Thorax with two testaceous stripes. Abdomen ferruginous, tawny beneath and with a dorsal stripe of tawny triangular spots. Legs blackish; femora and tibiæ partly testaceous. Wings dark grey.—*Var. 2.* Like *Var. 1.* Abdomen blackish above, with a dorsal stripe of testaceous spots.

Mount Ophir. Inhabits also Borneo.

21. *TABANUS PARTITUS*, n. s., fœm. Nigricans, subtùs albidus, antennis fulvis apice nigris, thorace cinerascente cano-quadrivittato, abdomine pieco albidotrivittato, pedibus testaceis, femoribus tibiisque apice tarsisque nigricantibus, alis subcinereis.

Female. Blackish; underside and head behind with whitish tomentum. Antennæ dull tawny, black towards the tips; angle of the 3rd joint minute and obtuse. Thorax greyish, with four hoary stripes. Abdomen piecous, with three whitish stripes. Legs testaceous; tarsi and tips of the femora and of the tibiæ blackish. Wings greyish, stigma and veins black; fore branch of the cubital vein simple, nearly straight. Length of the body 6 lines; of the wings 10 lines.

Singapore.

Note.—*T. rubidus*, *Wied.*, is very closely allied to the above species, but may be distinguished from it by the following characters.

T. rubidus. Front with the callus quite entire. Antennæ blackish. Middle stripe of the abdomen composed of triangular spots. Wings greyish.

T. partitus. Smaller. Front with the callus almost interrupted. Antennæ pale tawny, with darker tips. Middle stripe of the abdomen entire, parallel. Wings quite limpid.

Gen. CHRYSOPS, *Meigen.*

22. *Chrysops dispar*, *Fabr. Syst. Antl.* 112. 5.

Mount Ophir and Malacca. Inhabits also Hindostan and Java.

Fam. ASILIDÆ, *Leach.*

Subfam. DASYPOGONITES, *Walk.*

Gen. DISCOCEPHALA, *Macquart.*

23. *DISCOCEPHALA DORSALIS*, n. s., fœm. Nigricans, thorace subgibboso,

lateribus pectoreque testaceis, pedibus posticis longiusculis sat validis, tibiis posticis subarcuatis, alis subeineris apice obscurioribus.

Female. Blackish. Thorax somewhat gibbous; sides and pectus testaceous. Hind legs rather long and stout; hind tibiæ somewhat curved. Wings greyish, rather darker at the tips; veins black. Length of the body 5 lines; of the wings 12 lines.

Malacca.

Subfam. LAPHRITES, *Walk.*

Gen. LAPHRIA, *Fabr.*

24. *Laphria Reinwardtii*, *Wied. Auss. Zweifl.* i. 503. 7.

Malacca. Inhabits also Java and Sumatra.

25. *LAPHRIA NOTABILIS*, n. s., mas et fœm. Nigra, capite thoracisque maculis quatuor transversis lateribus auratis aut albis, abdominis lateribus albo-maculatis, pedibus pallidè flavis aut albis, femoribus tibiisque apice tarsisque nigris, alis fuscis basim versus sublimpidis.

Male and Female. Black. Head with pale gilded or white tomentum. Face convex towards the epistoma. Mystax with a few black bristles. Proboscis straight, porrect, linear. Third joint of the antennæ slender, linear, about twice the length of the 1st and 2nd together. Thorax with two transverse marks on each side of gilded or white tomentum; scutellum, sides of the hind part of the thorax, and spots on the pectus of the same hue. Segments of the abdomen with a white spot and a few black setæ on each side. Legs pale yellow or white, with hairs of the same hue and with a few black setæ; coxæ, tarsi, and tips of the femora and of the tibiæ black. Wings dark brown, almost limpid towards the base which is brown. Halteres pale yellow or whitish. Length of the body 7-9 lines; of the wings 14-18 lines. Malacca and Mount Ophir.

26. *Laphria Vulcanus*, *Wied. Auss. Zweifl.* i. 514. 25.

Malacca. Inhabits also Java.

27. *Laphria alternans*, *Wied. Auss. Zweifl.* i. 511. 20.

Singapore. Inhabits also Java.

28. *LAPHRIA ORCUS*, n. s., fœm. Nigra, nigro-hirsuta, scutello nigro-cyaneo, abdomine pedibusque nigro-purpureis, alis nigricantibus arcularum discis pallidioribus, halteribus albidis.

Female. Black, with black hairs and bristles. Face slightly convex. Mystax with numerous black bristles, extending over the whole surface. Scutellum dark blue. Abdomen and legs dark purple, the latter with whitish hairs on the coxæ. Wings blackish; disks of several of the areolets much paler; veins black. Halteres whitish. Length of the body 8 lines; of the wings 14 lines.

Malacca.

29. *Laphria aurifacies*, *Macq. Dipt. Erot. Suppl.* iii. 22. 33. pl. 2. f. 5.

Singapore and Malacca. Inhabits also the Moluccas.

30. *Laphria elegans*, *Walk. Cat. Dipt.* 2nd Ser. 551. 126.

Mount Ophir. Inhabits also Hindostan.

31. *LAPHRIA BASIFERA*, n. s., fœm. Obscurè nigra, capite albido tomentoso, mystace nigro, antennarum articulo 3^o fusiformi, thorace cano-sexvittato, abdominis lateribus albido-maculatis, apice compresso, alis subcinereis basi sublimpidis costæ dimidio apicali fusciscente.

Female. Dull black. Head with whitish tomentum and hairs. Face slightly convex towards the epistoma. Mystax with several black bristles. Proboscis lanceolate, stout, straight. Third joint of the antennæ fusiform, as long as the 1st and the 2nd. Thorax with six hoary stripes; the middle pair parallel, linear, very slender and almost contiguous. Abdomen with whitish spots along each side, compressed at the tip. Legs with whitish hairs and with black bristles. Wings greyish, almost limpid towards the base, brownish along the apical part of the costa; veins black. Length of the body 6 lines; of the wings 12 lines.

Singapore.

This may be the female of the following species.

32. *LAPHRIA RADICALIS*, n. s., mas. Nigra, capite argenteo, mystace nigro, antennarum articulo 3^o lineari, thorace strigis quatuor lateralibus transversis vittisque duabus intermediis albidis, abdominis lateribus albido-maculatis, ventre testaceo, alis nigro-fuscis dimidio basali limpido.

Male. Black. Head beneath with whitish hairs. Face flat, with silvery-white tomentum. Mystax with a few black bristles. Proboscis linear, rather slender. Third joint of the antennæ linear, a little longer than the 1st and the 2nd. Thorax with two transverse whitish marks on each side, and with two whitish middle stripes which are broader and further apart than those of *L. basifera*. Pectus with testaceous whitish tomentum. Abdomen with a row of whitish spots along each side; underside testaceous except at the tip. Legs with blackish hairs; femora with testaceous hairs. Wings blackish brown, limpid for almost half the length from the base; veins black. Halteres whitish. Length of the body 5 lines; of the wings 10 lines.

Mount Ophir, at the height of 4000 feet.

33. *LAPHRIA INAUREA*, n. s., fœm. Obscurè nigra, capite, thoracis lateribus, pectore abdominisque marginibus fulvo-tomentosis, mystace nigro, antennarum articulo 3^o longi-fusiformi, thorace cinereo-bivittato, abdomine ferrugineo, apice nigro, alis obscurè fuscis basi pallidioribus.

Female. Dull black. Head, sides of the thorax, pectus, and hind borders of the abdominal segments with tawny tomentum. Face slightly convex towards the epistoma. Mystax with a few black bristles. Third joint of the antennæ very elongate-fusiform, longer than the 1st and the 2nd. Thorax with two parallel cinereous stripes. Abdomen ferruginous, black and shining towards the tip; underside somewhat cinereous. Legs with tawny hairs. Wings dark brown, somewhat paler towards the base; veins black. Halteres testaceous. Length of the body 8 lines; of the wings 14 lines.

Singapore.

34. *LAPHRIA BASIGUTTA*, n. s., mas. Nigra, capite auro, mystace nigro, antennarum articulo 3^o lineari, thorace abdomineque fulvo-tomentosis, alis nigricantibus basi sublimpidis.

Male. Black. Face almost flat, with pale gilded tomentum. Mystax with

very few black bristles. Proboscis linear, more slender than that of *L. radicalis*. Third joint of the antennæ linear, a little longer than the 1st and the 2nd, more slender than that of *L. radicalis*. Thorax with dull tawny tomentum; pectus more cinereous. Abdomen more slightly tawny. Legs with cinereous hairs and black bristles. Wings blackish, almost limpid towards the base; veins black. Halteres tawny. Length of the body 5 lines; of the wings 9 lines.

Singapore.

35. *LAPHRIA FUSIFERA*, n. s., fœm. Nigra, cinereo-tomentosa, capite albido, mystace nigro, antennarum articulo 3º fusiformi, thoracis vittis duabus pectoreque canis, abdomine apicem versus rufo, alis subcinereis apud costæ dimidium apicale fusciscentibus.

Allied to *L. crassipes*, Fabr. *Female*. Black, with greyish tomentum. Head whitish in front, with white hairs beneath; face very convex towards the epistoma. Mystax with a few black bristles. Proboscis oblique, ascending, stout, straight, lanceolate. Third joint of the antennæ fusiform. Thorax with two hoary stripes; sutures and pectus hoary. Abdomen pale red towards the tip which is compressed. Legs with whitish hairs and black bristles. Wings greyish, brownish for half the breadth along the apical half of the costa; veins black. Length of the body 6 lines; of the wings 12 lines.

Singapore.

36. *LAPHRIA SOBRIA*, n. s., fœm. Nigra, fulvo-tomentosa, capite albo, mystace nigro, abdominis apice glabro, tibiis ferrugineis, alis cinereis basi sublimpidis.

Female. Black. Face flat, with shining white tomentum. Mystax with a few black bristles. Proboscis straight, slender, linear. Thorax and abdomen with tawny tomentum, the latter bare and shining towards the tip. Pectus more cinereous. Tibiæ somewhat ferruginous. Wings dark cinereous, almost limpid towards the base; veins black. Halteres testaceous. Length of the body 5 lines; of the wings 10 lines.

Singapore.

37. *LAPHRIA PLANA*, n. s., mas. Nigra, cinereo-tomentosa, capite albido, mystace nigro, antennarum articulo 3º elliptico, pedibus fulvis, alis cinereis, halteribus albidis.

Male. Black, with cinereous tomentum. Face whitish, flat. Mystax with very few black bristles. Proboscis straight, porrect, slightly lanceolate, somewhat short. Third joint of the antennæ elliptical, a little shorter than the 1st. Pectus hoary. Legs tawny. Wings grey; veins black. Halteres whitish. Length of the body 4 lines; of the wings 10 lines.

Singapore.

38. *LAPHRIA IMBELLIS*, n. s., fœm. Nigra, cinereo-tomentosa, capite albido, mystace albo, antennis fulvis, thoracis strigis transversis quatuor lateralibus vittisque tribus intermediis canis, abdominis segmentis maculis lateralibus albidis, pedibus fusco-fulvis, alis limpidis apice fuscis, halteribus albidis.

Female. Black, with cinereous tomentum. Head with white hairs beneath. Face whitish, slightly convex towards the epistoma. Mystax with a few

white bristles. Proboscis lanceolate, short, straight, porrect. Antennæ tawny. Thorax with two transverse hoary marks on each side, and with three indistinct hoary stripes. Pectus whitish. Abdominal segments with a transverse whitish spot on each side of the hind border. Legs tawny, with paler hairs; coxæ black; anterior tarsi towards the tips, hind tarsi at the base, and hind tibiae brown. Wings limpid, brown at the tips; veins black. Halteres whitish. Length of the body 5 lines; of the wings 10 lines.

Singapore.

Subfam. ASILITES, *Walk.*

Gen. ASILUS, *Linn.*

39. *ASILUS FUSIFORMIS*, n. s., fem. Niger, cinereo-tomentosus, capite albido, mystace testaceo, thoracis vittis tribus pectoreque canis, abdominis apice compresso glabro, pedibus rufis, tarsis nigris, femoribus anterioribus nigro-maculatis, alis subcinereis.

Female. Black, with cinereous tomentum. Head whitish in front, rather thickly clothed with whitish hairs; a few black bristles behind; face slightly convex towards the epistoma. Mystax with several testaceous bristles. Proboscis stout, straight, lanceolate. Palpi with thick black bristles. Antennæ black. Thorax with three indistinct hoary stripes. Pectus hoary. Abdomen oblanceolate, with whitish and black hairs, compressed, shining, and bare towards the tip. Legs red, very stout, beset with black spines; tarsi except at the base and knees black; a black spot on each of the anterior femora. Wings slightly cinereous; veins black, tawny at the base and along the costa. Halteres testaceous. Length of the body 13 lines; of the wings 24 lines.

Malacca.

40. *ASILUS LINEOSUS*, n. s., fem. Fuscus, capite subaurato, mystace testaceo nigroque, antennis pedibusque nigris, thorace aureo-quadrivittato, abdomine fulvo-fasciato, apice nigro compresso transversè ruguloso, tibiis luteis apice nigris, alis cinereis.

Female. Dark brown. Head with pale gilded tomentum, clothed beneath with whitish hairs; face convex towards the epistoma. Mystax with several testaceous bristles and with a few more slender black bristles. Proboscis stout, straight, lanceolate. Palpi thickly beset with black bristles. Antennæ black; arista almost thrice the length of the 3rd joint which is fusiform. Thorax with four dull pale gilded stripes; sides and pectus cinereous. Abdomen oblanceolate, with broad fawn-coloured bands, black, shining, compressed and transversely rugulose towards the tip. Legs black, armed with black spines; tibiae pale luteous, with black tips; onychia pale luteous. Wings cinereous; veins black. Halteres ferruginous. Length of the body 12 lines; of the wings 20 lines.

Singapore.

41. *ASILUS DEBILIS*, n. s., mas. Cinereus, capite flavido-albo, mystace testaceo nigroque, antennis fulvis, thorace fusco-bivittato, abdominis segmentis cano-

fasciatis, pedibus testaceis, femoribus tibiisque apice tarsisque nigricantibus, alis sublimpidis apice nigricantibus.

Male. Cinereous. Head with yellowish-white tomentum, clothed beneath with white hairs; face very slightly convex towards the epistoma. Mystax with a few testaceous, and with still fewer black bristles. Proboscis black, slightly lanceolate, rather slender. Antennæ tawny; 3rd joint and arista black, the latter four times the length of the former which is fusiform. Thorax with two brown stripes. Pectus hoary. Abdomen with a hoary band on the hind border of each segment. Legs testaceous, with very few black bristles; tarsi, except at the base and tips of the femora and of the tibiæ, black; hind femora and hind tibiæ mostly black. Wings nearly limpid, blackish towards the tips; veins black. Halteres testaceous. Length of the body 7 lines; of the wings 14 lines.

Malacca.

42. *ASILUS LATIFASCIA*, n. s., mas. Cinereo-niger, capite albido, mystace testaceo, thoracis vittis quatuor pectoreque canis, abdomine ferrugineo, basi apiceque nigris, pedibus fulvis nigro-variis, alis nigricantibus margine postico fusco.

Male. Black, with a slight cinereous tinge. Head with some whitish hairs beneath. Face whitish, flat. Mystax with many pale testaceous bristles. Proboscis straight, slightly lanceolate. Antennæ black. Thorax with four slight hoary stripes. Pectus hoary. Abdomen ferruginous, black at the base and towards the tip. Legs tawny; tarsi, hind femora, and tips of the posterior tibiæ black; anterior femora black above. Wings blackish, brown along the hind border; veins black. Halteres testaceous. Length of the body 9 lines; of the wings 16 lines.

Singapore.

43. *Asilus Barium*, *Walk. Cat. Dipt.* pt. 2. 426.

Mount Ophir. Inhabits also Ceylon and Sumatra.

Gen. *OMMATIUS*, *Illiger*.

44. *Ommatius Pennus*, *Walk. Cat. Dipt.* pt. 2. 469.

Malacca. Inhabits also Sumatra, Borneo, and Corea.

45. *Ommatius Hecale*, *Walk. Cat. Dipt.* pt. 2. 476.

Singapore.

46. *OMMATIUS GRACILIS*, n. s., mas. Nigro-fuscus, facie atrâ, thoracis lateribus pectoreque canis, pedibus fulvis, femoribus tibiisque apice tarsisque nigris, alis sublimpidis apice cinereis.

Male. Blackish-brown. Face flat, deep black. Proboscis black, rather slender, slightly lanceolate. Antennæ black. Pectus and sides of the thorax hoary. Abdomen dull black. Legs tawny; tarsi and tips of the femora and of the tibiæ black. Wings nearly limpid, dark grey towards the tips; veins black. Halteres testaceous. Length of the body 6 lines; of the wings 10 lines.

Mount Ophir.

Fam. LEPTIDÆ, *Westw.*Gen. LEPTIS, *Fabr.*

47. *LEPTIS DECISA*, n. s., mas. Nigra, capite albo, antennis testaceis basi nigris, thoracis callis testaceis, vittis duabus pectoreque canis, abdomine testaceo, vittâ dorsali fasciisque nigris, femoribus testaceis apice nigris, alis sublimpidis fasciâ apiceque fuscis.

Male. Black. Head white in front. Antennæ testaceous, black towards the base. Humeral calli testaceous. Thorax with two hoary stripes; sides and pectus hoary. Abdomen testaceous, with a black dorsal stripe and a black band on the hind border of each segment. Femora testaceous, with black tips; hind femora black for more than half the length from the tips. Wings nearly limpid, pale brown towards the tips, and with a darker brown band which tapers irregularly from the costa to the hind border and crosses the base of the discal areolet; veins black. Halteres testaceous. Length of the body $4\frac{1}{2}$ lines; of the wings 9 lines.

Malacca.

Fam. BOMBYLIDÆ, *Leach.*Gen. ANTHRAX, *Fabr.*

48. *ANTHRAX DEGENEREA*, n. s., mas et fœm. Nigra, pectore albido, abdominis lateribus ferrugineis, ventre testaceo, alis subcinereis, pedibus basi testaceis. Mas. Alis basi et apud costam nigro-fuscis. Fœm. Alis plus dimidio basali nigro-fuscis.

Male and Female. Dull black. Head not broader than long. Antennæ small; 3rd joint short-conical; arista somewhat longer than the 3rd joint. Pectus whitish. Abdomen blackish-brown, ferruginous on each side, testaceous beneath. Legs long, slender. Wings greyish; veins black; radial vein curved towards its tip; fore fork of the cubital undulating, parallel to the radial, forming near its base an obtuse angle which emits the stump of a vein; hind fork straight; three nearly straight externo-medial veins; 2nd connected with the 3rd by an undulating and very oblique veinlet; subanal vein near the anal on the border. Halteres testaceous.—*Male.* Hind femora testaceous towards the base; anterior femora dark testaceous. Wings blackish-brown at the base and along the costa.—*Female.* Hind femora testaceous with black tips; anterior femora paler testaceous. Wings blackish-brown for much more than half the length from the base. Length of the body $3\frac{1}{2}$ lines; of the wings 10 lines.

Singapore.

Fam. DOLICHOPIDÆ, *Leach.*Gen. PSILOPUS, *Meigen.*

49. *PSILOPUS CLARUS*, n. s., mas. Viridis, capite cyaneo, facie pectoreque albis, antennis nigris, abdominis segmentis nigro-fasciatis, pedibus testaceis, tibiis posticis apice tarsisque nigris, alis limpidis.

Male. Green. Head bright blue, white in front. Proboscis, legs and halteres

testaceous. Antennæ black; arista as long as the thorax. Pectus white. Abdominal segments with black bands. Legs long; tarsi and tips of the hind tibiæ black. Wings limpid; veins black; fore branch of the præbrachial vein slightly curved; hind branch extending to the border; discal transverse vein rather deeply undulating. Length of the body $4\frac{1}{2}$ lines; of the wings 8 lines.

Mount Ophir.

50. *PSILOPUS ROBUSTUS*, n. s., fem. Purpureo-cyanus, capite purpureo, facie pectoreque albis, antennis pedibus halteribusque testaceis, thorace viridi-vario, abdominis fasciis nigris, tarsis apice nigricantibus, alis subcinereis.

Female. Purplish-blue. Head bright purple, white in front. Proboscis and antennæ testaceous; arista black, full as long as the thorax. Thorax green on each side and in front. Pectus white. Abdomen with black bands. Legs long, pale testaceous; tarsi blackish towards the tips. Wings slightly greyish; veins black; fore branch of the præbrachial vein moderately curved; discal transverse vein moderately undulating. Halteres pale testaceous. Length of the body $2\frac{1}{2}$ lines; of the wings 6 lines.

This may be the female of *P. clarus*.

Singapore.

51. *PSILOPUS SUBNOTATUS*, n. s., mas. Cyanus, capite purpureo, facie pectoreque albis, proboscide antennis pedibusque testaceis, thoracis lateribus anticis viridibus, abdomine viridi-cyaneo basi apiceque purpurascente, tarsis apice nigricantibus, alis subcinereis albido-bifasciatis.

Male. Blue. Head purple above, white in front. Proboscis and antennæ testaceous; arista black, nearly as long as the thorax. Thorax green on each side in front. Pectus white. Abdomen greenish-blue, purplish at the base and at the tip. Legs testaceous, rather long; tarsi blackish towards the tips. Wings slightly greyish, with two imperfect whitish bands; hind border white towards the tip; costa interruptedly blackish; veins black; fore branch of the præbrachial vein almost straight; hind branch extending to the border; discal transverse vein almost straight, hardly undulating. Halteres pale testaceous. Length of the body $2\frac{1}{2}$ lines; of the wings 6 lines.

Mount Ophir.

52. *PSILOPUS POSTICTUS*, n. s., mas. Viridis, proboscide antennis abdominis fasciis pedibusque nigris, tibiis luridis, alis nigris apud marginem posticæ sublimpidis.

Male. Dark green. Head above bluish-green. Proboscis and antennæ arista nearly as long as the body. Abdomen with black bands. Legs black; posterior tibiæ lurid; fore tibiæ testaceous. Wings black, rather narrow, nearly limpid along the hind border; veins black; fore branch of the præbrachial vein slightly curved; discal transverse vein slightly undulating. Halteres black. Length of the body 2 lines; of the wings 5 lines.

Malacca.

53. *PSILOPUS TENEBROSUS*, n. s., fœm. Purpureo-niger, facie pectoreque albis, abdomine purpureo, pedibus fulvis, femoribus apice tarsisque nigricantibus, alis nigricantibus margine postico fasciâque sublimpidis.

Female. Purplish-black. Head dull black, white in front. Proboscis piecous. Antennæ black; arista rather shorter than the thorax. Pectus white. Abdomen dark purple. Legs tawny; tarsi and tips of the femora blackish. Wings blackish, nearly limpid along the hind border, and at two-thirds of the length with a nearly limpid band which extends from the hind border to the cubital vein; veins and halteres black; fore branch of the præbrachial vein very deeply curved; discal transverse vein almost straight. Length of the body 3 lines; of the wings 6 lines.

Singapore.

Fam. SYRPHIDÆ, *Leach.*

Gen. CERIA, *Fabr.*

54. *Ceria Javana*, *Wied. Auss. Zweifl.* ii. 81. 1.
Malacca. Inhabits also Java.

Gen. ERISTALIS, *Latr.*

55. *Eristalis Amphierates*, *Walk. Cat. Dipt.* pt. 3. 623.
Malacca. Inhabits also Hindostan, Java, and China.
56. *Eristalis niger?* *Wied. Auss. Zweifl.* ii. 183. 45.
Singapore. Inhabits also Java?
57. *ERISTALIS SINGULARIS*, n. s., fœm. Ater, aristâ nudâ, pedibus posticis subincrassatis, tibiis anterioribus basi testaceis, alis subcinereis apud costæ medium nigricantibus.
- Female.* Deep black. Head shining in front. Arista bare. Legs shining; hind femora rather thick; hind tibiæ slightly dilated; anterior tibiæ pale testaceous towards the base. Wings greyish, with a blackish tinge along the middle of the costa; veins black. Length of the body 4 lines; of the wings 8 lines.
- Singapore.

Gen. HELOPHILUS, *Meigen.*

58. *HELOPHILUS INSIGNIS*, n. s., fœm. Nigricans, capitis lateribus anticis pectorisque fasciis duabus testaceis, antennis ferrugineis, thoracis vittis quatuor, scutello abdominisque fasciis tribus luteis, hujus marginibus subchalybeis, tibiis fulvis apice nigricantibus, alis subcinereis basi subluridis apud costæ dimidium apicale fusciscentibus.
- Female.* Blackish. Head pale testaceous on each side in front. Antennæ ferruginous. Thorax with four luteous stripes. Pectus with a testaceous band on each side. Scutellum luteous. Abdomen with three luteous bands; 1st broad, interrupted; 2nd narrower than the 1st, broader than the 3rd; hind borders of the segments slightly chalybeous and shining. Tibiæ tawny, with blackish tips. Wings slightly greyish, with a lurid tinge at the base, and a slight brownish tinge along the costa beyond the middle; veins black, tawny towards the costa. Halteres testaceous. Length of the body 8 lines; of the wings 14 lines.
- Singapore.

Gen. *XYLOTA*, *Meigen*.

59. *XYLOTA CONFORMIS*, n. s., fœm. *Ænea*, capite femoribusque chalybeis, antennis fulvis, thorace testaceo-bivittato, abdominis fasciis duabus latis interruptis pedibusque testaceis, alis subcinereis.

Female. *Æneous*. Head chalybeous, with whitish tomentum in front, with short white hairs beneath. Proboscis black. Antennæ tawny; arista bare. Thorax with two testaceous tomentose stripes. Pectus with a testaceous band on each side. Abdomen with two broad interrupted testaceous bands. Legs testaceous; femora chalybeous; tarsi with brownish tips. Wings slightly greyish; veins black; stigma brown. Halteres testaceous. Length of the body 5 lines; of the wings 10 lines.

Singapore.

Gen. *MILEsia*, *Latr.*

60. *Milesia macularis*, *Wied. Auss. Zweifl.* ii. 107. 5.

Singapore. Inhabits also Java.

61. *Milesia Reinwardtii*, *Wied. Auss. Zweifl.* n. 104. 1.

Singapore. Inhabits also Java.

62. *MILEsia VESPOIDES*, n. s., mas. *Atra*, verticis maculâ trigonâ testaceâ, abdominis fasciâ latissimâ luteâ, femoribus posticis extus apices versus ferrugineis, alis fuscis apice luridis margine postico cinereis.

Male. Deep black. Head with a minute elongate-triangular testaceous spot on the vertex; fore part and humeral calli shining. Abdomen partly clothed with black hairs, with a very broad luteous band which occupies rather more than half the hind part of the 2nd segment and the fore half of the 3rd. Hind femora ferruginous on the outer sides towards the tips. Wings dark brown, lurid towards the tips, grey along the hind border. Halteres pale testaceous. Length of the body 11 lines; of the wings 22 lines. Singapore.

Gen. *SYRPHUS*, *Fabr.*

63. *SYRPHUS CONSEQUENS*, n. s., mas et fœm. *Luteus*, vertice nigro, antennis nigro-vittatis, thoracis disco chalybeo, abdominis fasciis quatuor atris, femoribus posticis apice neonon tibiis tarsisque posticis nigris, alis subcinereis apud costam subfuscis.

Closely allied to *S. ericetorum*.—*Male and Female*. Pale luteous. Head black and shining on the vertex by the antennæ, pale testaceous in front. Proboscis tawny. Antennæ tawny, with a black dorsal stripe; arista black. Disk of the thorax chalybeous. Abdomen with four deep black bands on the hind borders of the segments. Hind tibiæ, hind tarsi, and tips of hind femora black. Wings slightly greyish, with a brown tinge along the costa; veins black. Halteres pale testaceous.—*Female*. Vertical callus capitate. Length of the body $4\frac{1}{2}$ – $5\frac{1}{2}$ lines; of the wings 10–12 lines.

Singapore and Mount Ophir.

64. *SYRPHUS DUPLEX*, n. s., mas et fœm. *Chalybeo-niger*, gracilis, antennis maris piecis feminae fulvis, abdominis fasciis tribus interruptis testaceis,

femoribus anterioribus testaceis apice nigris, posticis basi testaceis, alis subcinereis.

Male and Female. Chalybeous black, slender. Antennæ of the male piccons, of the female tawny. Abdomen with three dull interrupted testaceous bands, slightly compressed for three-quarters of the length in the male. Legs black; anterior femora testaceous with black tips; hind femora testaceous at the base. Wings greyish; veins and stigma black. Halteres testaceous. Length of the body 6 lines; of the wings 12 lines.

Singapore.

65. *SYRPHUS TRILIGATUS*, n. s., mas. Flāvus gracilis, antennis fulvis, thoracis disco chalybeo-nigro, pectore et metathorace nigris, abdominis fasciis quatuor latis quatuorque angustis nigris, femoribus posticis nigro latè fasciatis, tibiis tarsisque posticis nigris, alis subcinereis.

Male. Pale yellow, rather slender. Antennæ tawny. Disk of the thorax chalybeous black. Pectus and metathorax mostly black. Abdomen with eight black bands which are alternately broad and narrow. Hind femora with a broad black band; hind tibiae and hind tarsi black. Wings greyish; stigma brown; veins black. Halteres pale testaceous. Length of the body $4\frac{1}{2}$ lines; of the wings 9 lines.

Mount Ophir.

Fam. MUSCIDÆ, Latr.

Subfam. TACHINIDÆ, Walk.

Gen. ECHINOMYIA, Duméril.

66. *ECHINOMYIA BREVIPENNIS*, n. s., mas. Nigra, capite anticè albo, frontibus ferrugineis, scutello abdominisque fasciis testaceis, alis subcinereis parvis basi limpidis.

Male. Black, stout. Head white, with white hairs beneath; front and vertex black, shining; frontalia ferruginous, slightly widening from the vertex to the antennæ; epistoma slightly prominent. Antennæ extending to two-thirds of the length of the face; 3rd joint truncate, not much longer than broad, much broader and shorter than the 2nd; arista stout, tapering from its two indistinct basal joints, full twice the length of the 3rd joint. Scutellum testaceous. Abdomen elongate-oval, longer than the thorax. Wings greyish, rather short, limpid towards the base; veins black, testaceous towards the base; præbrachial vein forming a very slightly acute angle at its flexure, near which it is very deeply curved inward, and is thence straight to its tip which joins the tip of the costal; discal transverse vein straight, parted by much less than its length from the border, and by little more than half its length from the flexure of the præbrachial. Aluke greyish, with testaceous borders. Length of the body 6 lines; of the wings 9 lines. Mount Ophir, at the height of 4000 feet.

Gen. TACHINA, Fabr.

67. *TACHINA OPHIRICA*, n. s., fœm. Cinerea, latiuscula, capite argenteo, fron-

talibus atris, thoracis vittis quatuor interruptis nigris, scutelli margine abdominisque fasciis canis, alis subcinereis.

Female. Cinereous, rather short and broad. Head hoary, silvery-white above and in front; frontalia deep black, slightly widening from the vertex to the antennae; facialia without bristles; epistoma hardly prominent. Antennae extending to about three-quarters of the length of the face; 3rd joint linear, slender, rounded at the tip, about twice the length of the 2nd; arista stout for about half its length, very much longer than the 3rd joint. Thorax with four slender interrupted black stripes; scutellum with a hoary border. Abdomen black, obconical, hardly longer than the thorax; a broad hoary band on the fore border of each segment. Wings slightly greyish; veins black; præbrachial vein forming an almost right and rather well-defined angle from whence it is slightly curved inward to its tip; discal transverse vein hardly curved inward, parted by rather less than its length from the border and from the flexure of the præbrachial. Alulae white. Length of the body 4 lines; of the wings 8 lines.

Mount Ophir, at the height of 4000 feet.

Gen. MASICERA, *Macquart*.

68. *Masicera tomentosa*, *Macq. Dipt. Exot. Suppl.* 2.

Mount Ophir, at the height of 4000 feet.

69. *MASICERA VICARIA*, n. s., fem. Nigra, longiusecula, capite albo, frontali-
bus atris, thoracis vittis quatuor, lateribus scutello abdominisque fasciis
duabus latis interruptis canis, alis cinereis.

Female. Black, rather long. Head white, with short white hairs beneath and behind; frontalia linear, deep black; facialia without bristles; epistoma not prominent. Eyes pubescent. Antennae extending nearly to the epistoma; 3rd joint linear, slender, slightly rounded at the tip, about four times the length of the 2nd; arista rather stout for full one-third of the length from the base, very much longer than the 3rd joint. Thorax with four hoary stripes; sides and scutellum hoary. Abdomen elongate-obconical, much longer than the thorax, with two broad interrupted hoary bands. Legs stout. Wings grey; veins black; præbrachial vein forming a rather obtuse angle at its flexure, from whence it is slightly curved inward to its tip; discal transverse vein undulating, parted by very little less than its length from the border and from the flexure of the præbrachial. Alulae whitish. Length of the body 5 lines; of the wings 9 lines.

Singapore.

Gen. EURIGASTER, *Macquart*.

70. *EURIGASTER MUSCOIDES*, n. s., fem. Nigra lata, capite albido, frontali-
bus nigris, palpis testaceis, thorace cano nigro-quadrivittato, scutelli apice
fulvo, abdomine cano-fasciato, alis cinereis apud costam fusciscentibus.

Female. Black, broad, with long bristles. Head whitish; frontalia black, linear; facialia without bristles; epistoma not prominent. Eyes pubescent. Palpi testaceous. Antennae extending to the epistoma; 3rd joint linear, rounded at the tip, full four times the length of the 2nd; arista

slender, very much longer than the 3rd joint. Thorax hoary, with four black stripes. Scutellum tawny towards the tip. Abdomen obconical, hardly longer than the thorax, with a broad hoary band on each segment. Legs slender, hardly setose. Wings grey, brownish in front; veins black; præbrachial vein forming a slightly obtuse angle at its flexure, from whence it is slightly curved inward to its tip; discal transverse vein straight except a slight curve by its hind end, parted by much less than its length from the border, and by rather more than its length from the flexure of the præbrachial. Alulae white. Length of the body 3 lines; of the wings 6 lines. Singapore.

Gen. ZAMBESA, n. g. (Plate I. fig. 2.)

Mas. Corpus longum, angustum, subcylindricum. *Facies* verticalis, subretracta. *Facialia* nuda. *Epistoma* planum. *Palpi* longiusculi, sat graciles. *Antennarum* articulus 3^{us} gracilis, linearis, 2^o sexties longior; aristâ gracillimâ. *Oculi* nudi. *Abdomen* lineare, thorace multò longius. *Pedes* longiusculi. *Alae* sat angustae.

Male. Body long, narrow, almost cylindrical. Face vertical, slightly retracted towards the base. Facialia without bristles. Eyes remote, bare. Palpi rather long and slender. Antennae extending to the epistoma; 3rd joint slender, linear, rounded at the tip, six times the length of the 2nd; arista very slender, rather longer than the 3rd joint. Abdomen linear, much longer than the thorax. Legs rather long. Wings rather narrow; costal vein ending at hardly in front of the tip of the wing; brachial vein joining the cubital.

71. ZAMBESA OCYPTEROIDES, n. s., mas. Nigra, capite albo, frontalibus atris, antennarum articulo 3^o fulvo, thorace cano nigro-quadrivittato, abdominis fasciis duabus latis interruptis semihyalinis albido-testaceis, femoribus testaceis apice nigris, tibiis piccis, alis limpidis, apice margineque postico cinereis.

Male. Black. Head white, with short white hairs beneath; frontalia deep black, linear. Proboscis testaceous. Palpi black. Third joint of the antennae tawny. Thorax hoary, with four black stripes, of which the outer pair are very much broader than the inner pair. Abdomen a little narrower than the thorax, with two broad whitish testaceous semihyaline bands which are interrupted above. Femora testaceous, with black tips; tibiae picceous. Wings limpid, grey towards the tips and along the hind borders; veins black; præbrachial vein forming an obtuse angle at its flexure from whence it is slightly curved inward to its tip, which joins the cubital very near the border; discal transverse vein very slightly curved inward, parted by less than its length from the border, and by more than its length from the flexure of the præbrachial. Alulae white. Length of the body 5 lines; of the wings 10 lines.

Singapore.

Subfam. DEXIDES, *Walk.*

Gen. DEXIA, *Meigen.*

72. DEXIA DIVERGENS, n. s. (gen. Thelaira, *Descr.*), mas. Cauda longa an-

gusta, capite albo, frontalibus atris, proboscide palpis antennisque testaceis, aristâ plumosâ, thorace nigro-quadrivittato, abdomine testaceo semihyalino, vittâ fasciisque nigris, pedibus longis testaceis, tarsis nigris, alis subcinereis.

Male. Body hoary, long, narrow, with long black bristles. Head white; frontalia deep black, widening from the vertex to the antennæ; facialia without bristles; epistoma not prominent. Eyes bare. Proboscis and palpi testaceous. Antennæ testaceous, not nearly extending to the epistoma; 3rd joint slender; arista black, plumose. Thorax with four black stripes, of which the outer pair are broader than the inner pair. Abdomen testaceous, semihyaline, with a black dorsal stripe, and with a black band on the hind border of each segment. Legs long, testaceous; tarsi black. Wings greyish; veins black; præbrachial vein forming a hardly obtuse angle at its flexure, from whence it is indistinctly undulating to its tip which joins the costal at a little in front of the tip of the wing; discal transverse vein slightly curved inward near its hind end, parted by hardly more than half its length from the border, and by hardly less than its length from the flexure of the præbrachial. Alulae whitish. Length of the body 6 lines; of the wings 11 lines.

Mount Ophir.

Subfam. SARCOPHAGIDES.

Gen. SARCOPHAGA, *Meigen*.

73. *Sarcophaga ruficornis*, *Fabr. Syst. Antl.* 287. 12. (Musca.)

Malacca. Inhabits also Hindostan.

74. *SARCOPHAGA RECIPROCA*, n. s., fem. Cana, capite albo, frontalibus palpis antennis thoracis vittis pedibusque nigris, abdomine subtessellato, alis subcinereis.

Female. Hoary. Head white; frontalia black, linear. Proboscis, palpi and antennæ black. Thorax with three black stripes, and with black lines intersecting the two intermediate hoary stripes. Abdomen slightly tessellated. Legs black. Wings greyish; veins black; præbrachial forming a right angle at its flexure, near which it is much curved inward, and is thence straight to its tip; discal transverse vein slightly undulating, parted by less than its length from the border, and by little more than half its length from the flexure of the præbrachial. Alulae white. Length of the body 6 lines; of the wings 11 lines.

Singapore. A smaller specimen from Malacca apparently belongs to this species.

75. *SARCOPHAGA ALIENA*, n. s., fem. Cana, capite albo, frontalibus palpis antennis thoracis vittis pedibusque nigris, abdomine tessellato, alis subcinereis.

Female. Hoary. Head white; frontalia black, slightly widening in front. Proboscis, palpi and antennæ black. Thorax with three black stripes, and with black lines intersecting the two intermediate hoary stripes. Abdomen tessellated. Legs black. Wings slightly greyish; veins black; præbrachial forming a very slightly acute angle at its flexure, near which it is much curved inward, and is thence straight to its tip; discal transverse vein

hardly undulating, parted by a little less than its length from the border, and by much more than half its length from the flexure of the præbrachial vein. Alulae white. Length of the body 4 lines; of the wings 8 lines.

Mount Ophir.

Subfam. MUSCIDES.

Gen. IDIA, *Meigen*.

76. IDIA TENEBROSA, n. s., fœm. Obscurè viridis punctata, capite pedibus halteribusque nigris, antennis piceis, alis fusco-cinereis apud costam nigris.

Female. Dull green. Head slightly tuberculated above, black and shining in front. Frontalia dull black, hardly decreasing in breadth to the base of the antennæ which are piceous. Thorax very minutely punctured, with a slight hoary tinge which is interrupted by three slender indistinct black stripes. Abdomen shining, thickly punctured. Legs black. Wings brownish grey, black along the costa. Alulae grey, with black borders. Halteres black. Length of the body $4\frac{1}{2}$ lines; of the wings 7 lines.

Mount Ophir. Inhabits also South Africa.

77. IDIA BICOLOR, n. s., fœm. Viridis, capite albido, facie nigrâ, frontalibus obscurè nigris, antennis fulvis, thorace nigro-quadrivittato, abdomine æneomarginato, vittâ dorsali nigrâ, pedibus nigris, alis cinereis costâ apiceque nigricantibus, halteribus albidis.

Female. Green. Head whitish and shining above, black and shining in front. Frontalia dull black, linear, fureate hindward. Antennæ tawny. Thorax with a slight hoary bloom and with four slender black stripes. Abdomen æneous at the tip and along each side, and with a slight black dorsal stripe. Legs black; coxæ and femora green. Wings grey, blackish along the costa and at the tips. Alulae dingy whitish. Halteres whitish. Length of the body 3 lines; of the wings 5 lines.

Malacca.

Gen. MUSCA, *Lin.*

78. MUSCA flaviceps, *Macq. Dipt. Exot.* ii. 2. 145. 23. pl. 18. f. 1. (Lucilia.) (Genus Chrysomyia, *Desr.*)

Singapore. Inhabits also Hindostan.

79. MUSCA CHRYSOIDES, n. s. (genus Chrysomyia, *Desr.*), mas. Sericeo-viridis, capite testaceo, palpis antennisque fulvis, abdominis vittâ dorsali fascisque nigris, alis subcinereis apice obscurioribus.

Male. Sericeous green, hardly shining. Head testaceous. Proboscis black. Palpi and antennæ tawny. Abdomen with a black dorsal stripe, and with a black band on the hind border of each segment. Legs black; coxæ and femora green. Wings greyish, much darker towards the tips; veins black, tawny along the costa; præbrachial vein forming a very obtuse and somewhat rounded angle at its flexure, from whence it is slightly curved inward to its tip; discal transverse vein deeply undulating, parted by much less than its length from the border, and by a little less than its length from the flexure of the præbrachial vein. Alulae dingy testaceous. Length of the body 5 lines; of the wings 10 lines.

Malacca and Mount Ophir.

80. *MUSCA PORPHYRINA*, n. s. (genus *Lucilia*, *Desc.*), fœm. Purpurea, capite albido, antennis pedibusque nigris, palpis fulvis, abdomine æneo-purpureo, alis cinereis.

Female. Purple. Head whitish. Proboscis and antennæ black. Palpi tawny. Thorax with a slight hoary tinge which is very indistinctly striped. Abdomen bronze-purple. Legs black. Wings grey; veins black; præbrachial vein forming a very slightly obtuse angle at its flexure, from whence it is very slightly curved inward to its tip; discal transverse vein nearly straight, parted by little more than half its length from the border and from the flexure of the præbrachial. Alulae dark grey. Length of the body $4\frac{1}{2}$ lines; of the wings 9 lines.

Mount Ophir, at the height of 4000 feet.

81. *MUSCA TRITA*, n. s. (genus *Lucilia*, *Desc.*), fœm. Cyaneo-viridis, capite pedibusque nigris, facie albâ, thoracis lateribus subpurpurascens, abdominis lateribus apiceque albido-tomentosis, alis sublimpidis.

Female. Bright bluish-green. Head and appendages and legs black; face white. Sides of the thorax slightly purplish. Abdomen green, with slight whitish tomentum along each side and at the tip. Wings almost limpid; veins black; præbrachial vein forming a very obtuse and slightly rounded angle at its flexure, from whence to its tip it is hardly curved inward; discal transverse vein hardly curved inward, parted by much less than its length from the border and by a little less than its length from the flexure of the præbrachial vein. Alulae greyish. Length of the body 3 lines; of the wings 6 lines.

Malacca.

82. *MUSCA DEFIXA*, n. s. (genus *Lucilia*, *Desc.*), mas. Cyaneo-viridis, capite albido, epistomate testaceo, palpis pedibusque nigris, antennis fulvis, alis subcinereis.

Male. Bluish-green. Head whitish; epistoma testaceous. Proboscis, palpi and legs black. Antennæ tawny. Wings greyish; veins black; præbrachial vein forming a slightly obtuse and slightly rounded angle at its flexure, from whence to its tip it is moderately curved inward; discal transverse vein slightly undulating, parted by one-third of its length from the border, and by less than half its length from the flexure of the præbrachial. Alulae grey. Length of the body 3 lines; of the wings 6 lines.

Singapore.

83. *MUSCA REFLECTENS*, n. s. (genus *Pollenia*, *Desc.*), fœm. Purpureo-cyanea, viridi-varia, capite fulvo, frontalibus cinereis, palpis antennisque testaceis, pectore testaceo, maculis duabus purpureo-cyaneis, abdomine cano-subtessellato, apice æneo, pedibus validis nigris, tibiis fulvis, alis subcinerascens.

Female. Purplish-blue tinged with green, hardly shining. Head fawn-colour, testaceous in front; frontalia cinereous. Proboscis black. Palpi, antennæ and pectus testaceous, the latter with a purplish-blue mark on each side. Abdomen slightly tessellated with hoary tomentum, æneous at the tip. Legs black, stout; tibiæ tawny. Wings very slightly greyish; veins black, testaceous towards the base and along the costa; præbrachial

vein forming a very obtuse angle at its flexure, from whence it is slightly undulating to its tip; discal transverse vein very deeply undulating, parted by full half its length from the border, and by much less than its length from the flexure of the præbrachial vein. Aluke white. Length of the body 5 lines; of the wings 10 lines.

Malacca.

84. *MUSCA INFIXA*, n.s. (genus *Silbomyia*, *Macq.*), fœm. Viridi-cyanea, capite albido, frontalibus antennisque nigris, palpis fulvis, thoracis vittis quatuor abdomineque purpureis, pedibus piceis, femoribus cyanascentibus, alis cinereis costâ venisque fuscis-marginatis.

Female. Greenish-blue. Head whitish. Frontalia, proboscis and antennæ black. Palpi tawny. Thorax with four purple stripes. Abdomen purple. Legs piceous; femora bluish. Wings grey, brownish along the costa and along the borders of the veins, which are black; præbrachial vein forming an almost right and somewhat rounded angle at its flexure, from whence it is very slightly curved inward to its tip; discal transverse vein very slightly undulating, parted by full half its length from the border, and by much more than its length from the flexure of the præbrachial vein. Aluke dark grey. Length of the body 5 lines; of the wings 10 lines.

Singapore.

85. *MUSCA FUMIPENNIS*, n.s. (genus *Silbomyia*, *Macq.*), fœm. Cyaneo-viridis, capite testaceo, frontalibus piceis, palpis antennisque testaccis, thoracis vittis quatuor subobsoletis purpurascentibus, scutello abdomineque purpureo-cyaneis, pedibus nigris robustis densè pilosis, alis fuscis, apud costæ dimidium basale sublimpidis.

Female. Bluish-green. Head pale testaceous; frontalia piceous. Proboscis black. Palpi and antennæ testaceous. Thorax with four very indistinct purplish stripes. Scutellum and abdomen purplish-blue. Legs black, stout, thickly pilose; fore coxæ tawny. Wings brown, paler at the tips and along the hind border, nearly limpid along the costa for half the breadth, and rather less than half the length from the base; veins black; præbrachial vein forming a very slightly oblique and much-rounded angle at its flexure, from whence it is moderately curved inward to its tip; discal transverse vein nearly straight, parted by rather more than half its length from the border, and by much less than its length from the flexure of the præbrachial vein. Aluke grey. Length of the body 5 lines; of the wings 10 lines.

Singapore.

86. *MUSCA DOTATA*, n.s. (genus *Phormia*? *Desc.*), mas. Viridis, capite antico albo, palpis antennisque fulvis, abdominis vittâ dorsali nigrâ fasciisque nigro-æneis, pedibus nigris, alis cinereis, dimidio apicali antico nigro-fusco.

Male. Green. Head white in front. Proboscis black. Palpi and antennæ tawny. Abdomen with a black dorsal stripe, and with blackish bronze bands. Legs black. Wings grey; apical half blackish-brown, excepting the hind border; veins black; præbrachial vein forming a very obtuse and somewhat rounded angle at its flexure, from whence it is very slightly

curved inward to its tip; discal transverse vein moderately undulating, parted by little more than half its length from the border and by rather less than its length from the flexure of the præbrachial. Alulae grey. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

Singapore.

87. *MUSCA DIFFIDENS*, n. s. (genus *Pyrellia*, *Descr.*), fem. Cyaneo-viridis, capite albido, palpis antennis pedibusque nigris, alis vix cinerascensibus.

Female. Bright bluish-green. Head whitish. Proboscis, palpi, antennæ and legs black. Wings hardly greyish; veins black; præbrachial vein gently curved at its flexure, from whence it is almost straight to its tip; discal transverse vein almost straight, parted by much less than its length from the border, and by much more than its length from the curve of the præbrachial vein. Alulae whitish. Length of the body 3 lines; of the wings 6 lines.

Singapore.

88. *MUSCA CONFIXA*, n. s. (genus *Pyrellia*, *Descr.*), fem. Lætè viridis cyaneo purpureoque varia, capite nigro, antice albido, palpis testaceis, antennis nigris basi rufescentibus, abdominis apice subæneo, pedibus nigris, alis cinereis.

Female. Bright green, tinged with blue and purple along each side. Head black above, whitish in front. Proboscis black. Palpi testaceous. Antennæ black; first and second joints reddish. Abdomen slightly æneous at the tip. Legs black; femora green. Wings grey; veins black; præbrachial vein gently curved at its flexure, between which and its tip it is slightly curved inward; discal transverse vein moderately undulating, parted by much less than its length from the border, and by a little less than its length from the flexure of the præbrachial vein. Alulae dark grey. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

Mount Ophir, at the height of 4000 feet.

89. *MUSCA REFIXA*, n. s. (genus *Pyrellia*, *Descr.*), fem. Purpurea, lateribus subtusque cyanea aut cyaneo-viridis, capite antico, palpis pedibusque nigris, antennarum articulo tertio piceo, alis subcinereis.

Female. Purple shining, blue on each side and beneath. Head in front, proboscis, palpi and legs black. Third joint of the antennæ piceous. Wings slightly greyish; veins black; præbrachial vein forming a gentle curve at its flexure, which is very near the border, indistinctly curved outward from thence to its tip; discal transverse vein almost straight, parted by little more than half its length from the border, and by about its length from the flexure of the præbrachial vein. Alulae grey. Length of the body $2\frac{1}{2}$ – $2\frac{3}{4}$ lines; of the wings 5 – $5\frac{1}{2}$ lines.

Var. β. Bluish-green. Scutellum purplish-blue. Discal transverse vein very indistinctly curved inward.

Singapore.

90. *MUSCA PERFIXA*, n. s. (genus *Pyrellia*, *Descr.*), fem. Purpurea, capite palpis antennis pedibusque nigris, alis limpidis.

Female. Very nearly allied to *M. refixa*. Purple, shining. Head and appendages and legs black. Wings limpid; veins black; præbrachial vein

forming a gentle curve at its flexure which is very near the border, straight from thence to its tip; discal transverse vein almost straight, parted by about half its length from the border, and by a little more than its length from the flexure of the præbrachial vein. Alula whitish. Length of the body 3 lines; of the wings 6 lines.

Mount Ophir.

91. *MUSCA AFFIXA*, n. s. (genus *Morellia*, *Desv.*), mas. Obscurè nigra, capite antico albo, thoracis vittis tribus latis albidis, abdomine subtessellato, alis subcinereis.

Male. Dull black. Head white in front. Thorax with three broad whitish stripes. Abdomen slightly tessellated. Wings greyish; veins black; præbrachial vein forming a gentle curve at its flexure which is very near the border, nearly straight from its flexure to its tip; discal transverse vein hardly undulating, parted by less than half its length from the border, and by little less than its length from the flexure of the præbrachial vein. Alula grey. Length of the body 4 lines; of the wings 7 lines.

Mount Ophir.

Subfam. ANTHOMYIDES, *Walk.*

Gen. *ARICIA*, *Macq.*

92. *ARICIA ARGENTATA*, n. s., mas. Cana, capite argenteo, palpis antennis pedibusque nigris, thoracis vittis duabus nigricantibus, scutelli apice testaceo, abdominis maculis quatuor nigris dorsalibus basi testaceo, femoribus testaceis, alis subcinereis.

Male. Hoary. Head silvery-white. Proboscis, palpi, antennæ and legs black. Thorax with two blackish stripes. Scutellum towards the tip and femora testaceous. Abdomen with four black dorsal spots, testaceous towards the base. Wings and alula slightly greyish; veins black, testaceous towards the base; cubital and præbrachial veins slightly diverging for about two-thirds of their length from the præbrachial transverse vein, very slightly converging from thence to the border; discal transverse vein oblique, slightly curved inward along its hind half, parted by a little more than its length from the præbrachial transverse, and by much less than its length from the border. Length of the body $3\frac{1}{2}$ lines; of the wings 6 lines.

Malacca.

Gen. *HYDROTEA*, *Macq.*

93. *HYDROTEA SOLENNIS*, n. s., mas. Nigra, capite cano, thorace subcinereo nigro-trivittato, abdomine longi-obconico, tibiis ferrugineis, alis subcinereis.

Male. Black. Head hoary in front. Thorax slightly cinereous, with three black stripes. Abdomen elongate-obconical. Tibiæ ferruginous. Wings slightly greyish; veins black, testaceous at the base; cubital and præbrachial veins slightly diverging for nearly two-thirds of their length from the præbrachial transverse vein, very slightly converging from thence to the border; discal transverse vein oblique, curved inward in the middle, parted by about its length from the præbrachial transverse and by little more than

half its length from the border. Alulae greyish. Length of the body $2\frac{3}{4}$ lines; of the wings 5 lines.

Mount Ophir, at the height of 4000 feet.

94. *ARICIA PATTULA*, n. s., mas. Nigra sat lata, antennis, thoracis lateribus, abdomine pedibusque fulvis, abdominis apice tarsisque nigris, alis cinereis.

Male. Black, rather broad. Eyes bright red. Antennae, sides of the thorax, scutellum, abdomen and legs tawny. Abdomen hardly longer than broad, black towards the tip. Tarsi black. Wings and alulae grey; veins black, tawny towards the base; cubital and præbrachial veins diverging for more than two-thirds of their length from the præbrachial transverse, parallel from thence to their tips; discal transverse vein very oblique, curved inward near its hind end, parted by more than half its length from the border, and by very little more than its length from the præbrachial transverse vein. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

Singapore.

Subfam. HELOMYZIDES, *Fallen*.

Gen. XARNUTA, n. g. (*Plate I. fig. 4.*)

Helomyza affinis; mas et fœm. Corpus sat latum. Antennarum articulus 3^{us} linearis; arista nuda. Femora antica subtus tenuiter spinosa. Alae latiusculæ.

Allied to *Helomyza*. *Male and Female*. Body rather broad. Third joint of the antennae linear, rounded at the tip; arista bare. Fore femora with slender spines. Wings somewhat broad; discal transverse vein slightly oblique, parted by much less than half its length from the border, and by about its length from the præbrachial transverse vein.

95. *XARNUTA LECOTELUS*, n. s., mas et fœm. Ferrugineo-fulva, antennis testaceis, pedibus fulvis, alis nigro-fuscis apice albis, margine postico subcinereo.—Fœm. Abdominis apice nigro.

Male and Female. Ferruginous tawny, with black bristles. Head rather paler. Antennae testaceous; arista black. Legs tawny; fore femora with black spines beneath. Wings blackish-brown, greyish along the hind border for more than half the breadth and less than half the length from the base; extreme tips white; veins black. Alulae whitish testaceous.

Female. Tip of the abdomen black. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

Singapore.

Gen. HELOMYZA, *Fallen*.

96. *HELOMYZA INTEREUNS*, n. s., mas. Fulva, capite metathorace pectore pedibusque testaceis, abdominis maculis transversis nigricantibus, tarsis ferrugineis, alis subcinereis apices versus et apud venam transversam discalem fuscis.

Male. Tawny with black bristles. Head, metathorax, pectus, legs and halteres testaceous. Abdomen with a transverse blackish mark on the disk of each segment towards the tip. Tarsi somewhat ferruginous. Wings slightly greyish; tips brown, which hue is darkest in front; veins tawny,

black towards the tips; transverse veins black. Discal transverse vein clouded with brown, parted by much less than its length from the border, and by much more than twice its length from the præbrachial transverse vein. Alulae whitish. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines. Malacca.

97. *HELOMYZA EXEUNS*, n. s., mas. Fulva, capite antico, metathorace pectore pedibusque testaceis, abdominis maculis transversis nigricantibus, tarsis ferrugineis apice fuscis, alis subcinereis maculâ apiceibusque fuscis.

Very nearly allied to *H. intereuns*. *Male*. Tawny. Head in front, metathorax, pectus, legs and halteres testaceous. Abdomen with a transverse blackish mark on the disk of each segment. Tarsi ferruginous, with black tips. Wings slightly greyish; tips brown; veins black, tawny at the base; a brown spot on the discal transverse vein, which is straight, slightly oblique, parted by less than its length from the border, and by about thrice its length from the discal transverse vein. Alulae whitish. Length of the body $2\frac{1}{4}$ lines; of the wings $4\frac{1}{2}$ lines.

Mount Ophir.

Subfam. LAUXANIDES, *Walk.*

Gen. LAUXANIA, *Latr.*

98. *LAUXANIA EUCERA*, n. s., mas. Nigra cinereo-tomentosa, capite atrobiguttato, antennis piecis longissimis, aristâ albâ, abdomine pedibusque fulvis, femoribus tibiisque nigro-fasciatis, alis subcinereis apud costam subluridis.

Male. Black, with greyish tomentum. Head with a deep black spot on each side between the eyes. Proboscis dull tawny. Palpi black. Antennae piecous; 1st joint long; 3rd slender, cylindrical, longer than the 1st and the 2nd together; arista white, pubescent, longer than the 3rd joint. Abdomen and legs tawny; femora and tibiae with black bands; tarsi with black tips. Wings greyish, slightly lurid along the costa; veins black; discal transverse vein straight, slightly oblique, parted by less than its length from the border, and by more than twice its length from the præbrachial transverse vein. Halteres tawny. Length of the body 2 lines; of the wings $4\frac{1}{2}$ lines.

Singapore.

99. *LAUXANIA DETEREUNS*, n. s., fœm. Nigra, nitens, antennis piecis, aristâ nigrâ, tarsis anticis basi tibiisque tarsisque posterioribus testaceis, alis subcinereis.

Female. Black, shining, with black bristles. Antennae piecous; 3rd joint elongate-conical, much shorter than that of *L. eucera*; arista black, pubescent, full thrice the length of the 3rd joint. Fore tarsi at the base and posterior tibiae and tarsi testaceous. Wings slightly greyish; veins and halteres testaceous; discal transverse vein straight, almost upright, parted by almost its length from the border and by nearly twice its length from the præbrachial transverse vein. Length of the body $1\frac{1}{4}$ line; of the wings 3 lines.

Mount Ophir, at the height of 4000 feet.

Gen. CELYPHUS, *Dalman*.

100. *Celyphus obtectus*, *Dalman*, *Analecta Entomologica*, 32. 1. pl. 2. B. f. 1-5.

Malacca. Inhabits also Hindostan and the Philippine Islands.

Subfam. ORTALIDES, *Haliday*.Gen. LAMPROGASTER, *Macq.*

101. LAMPROGASTER ZONATA, n. s., fœm. Nigra, capite flavo nigro-vario, antennis piceis, thorace flavo-quadrivittato, abdomine flavo-bifasciato, tarsis albis, alis subcinereis maculis costalibus fasciâque fuscis.

Female. Black, shining. Head pale yellow, with four black shining stripes in front; vertex, with a broad dull black stripe which occupies the whole breadth behind, is notched on each side between the eyes, and is narrower in front. Antennæ piceous; 3rd joint nearly linear, rounded at the tip; arista minutely plumose, more than twice the length of the 3rd joint. Thorax with four yellow stripes, one on each side in front of the wings, and one on each side of the scutum. Abdomen with two yellow bands; 1st slender; 2nd apical, dilated in the middle of the fore border; knees tawny; tarsi white, with blackish tips. Wings greyish, slightly lurid and with brown marks at the base and along the costa, and with a brown band which extends along the præbrachial vein to half the space between the latter and the border; discal transverse vein straight, upright, parted by about one-third of its length from the border, and by much more than its length from the præbrachial transverse, which is oblique. Halteres tawny. Length of the body 5 lines; of the wings 10 lines.

Singapore.

102. LAMPROGASTER GLABRA, n. s., mas. Nigra, antennis piceis, abdominis fasciâ subapicali flavâ, tarsis albis, alis sublimpidis maculis basalibus fasciisque quatuor fuscis.

Male. Black, shining. Antennæ piceous, in structure like those of *L. zonata*. Abdomen with a slender yellow band near the tip. Tarsi white, with black tips. Wings nearly limpid, with four brown bands, slightly testaceous and with some indistinct brown marks at the base; 1st and 3rd bands entire; 1st broader and darker than the others; 2nd and 4th interrupted; veins black, testaceous towards the base; discal transverse vein straight, upright, parted by one-fourth of its length from the border, and by more than its length from the præbrachial transverse vein, which is also upright. Halteres tawny. Length of the body 3 lines; of the wings 6 lines.

Singapore.

103. LAMPROGASTER TRANSVERSA, n. s., fœm. Nigra, capite fulvo fasciis duabus nigris unâque albidâ, antennis fulvis, thoracis vittis quatuor dorsalibus fulvis duabusque lateralibus albidis, abdomine nigro-purpureo basi fulvo maculisque duabus subapicalibus flavis, pedibus fulvis, tarsis albidis, alis subcinereis fusco sexfasciatis.

Female. Black. Head tawny, with two black bands above and a whitish band in front. Antennæ tawny. Thorax with four dorsal tawny stripes which

are confluent in front and with two lateral whitish stripes. Abdomen blackish-purple, tawny at the base, and with a yellow spot on each side near the tip which is lanceolate. Legs tawny; tarsi whitish, with black tips; hind tibiae with brownish tips. Wings slightly greyish, with about six irregular macular brown bands; veins brown, tawny at the base; discal transverse vein nearly straight and upright, parted by much less than its length from the border, and by more than its length from the præbrachial transverse vein, which is oblique. Halteres testaceous. Length of the body 4 lines; of the wings 8 lines.

Malacca.

104. *LAMPROGASTER VITTATA*, n. s., mas. Nigra, capite ex parte flavo, antennis fulvis, thorace flavo-bivittato, scutello flavo-marginato, abdominis vittâ dorsali flavâ, tarsis albis, alis nigricantibus basi fasciisque quatuor albidis.

Male. Black, shining. Head pale yellow in front, beneath and about the eyes. Antennæ tawny. Thorax with two yellow stripes; scutellum with a yellow border. Pectus with an oblique yellow band on each side. Abdomen with a yellow dorsal stripe. Tarsi white, with black tips. Wings blackish, whitish at the base, and with four whitish bands; 1st band irregular; 2nd and 3rd entire; 4th interrupted; veins black; discal transverse vein straight, upright, parted by about one-fourth of its length from the border, and by much more than its length from the præbrachial transverse vein, which is slightly oblique. Halteres testaceous. Length of the body 3 lines; of the wings 6 lines.

Singapore.

105. *LAMPROGASTER GUTTATA*, n. s., fœm. Cinerea, capite nigro trimaculato anticè testaceo, antennis fulvis, thorace cano-quinquevittato, lateribus testaceis, abdominis fasciâ anticâ fulvâ, tarsis albidis, alis subcinereis fasciis octo subinterruptis fuscis.

Female. Black, with cinereous tomentum. Head partly dull testaceous in front; vertex with three black spots, two in front and one behind. Antennæ tawny; arista pubescent. Thorax with five hoary stripes which are connected in front by a transverse band; sides testaceous. Pectus with an oblique dull testaceous stripe on each side. Abdomen with a tawny band on the hind border of the first segment; oviduct slender, lanceolate. Tarsi whitish, with black tips. Wings greyish, with about eight irregular and partly interrupted brown bands; veins and halteres testaceous; discal transverse vein nearly straight and upright, parted by about one-fourth of its length from the border, and by more than its length from the præbrachial transverse vein. Length of the body 3 lines; of the wings 6 lines.

Singapore.

106. *LAMPROGASTER TRUNCATULA*, n. s., fœm. Nigra robusta, abdominis apice compresso lanceolato, tarsis albis, alis subcinereis lituris transversis fusciscentibus fasciisque duabus nigro-fuscis.

Female. Black, stout, slightly shining. Arista pubescent. Abdomen compressed and lanceolate at the tip. Tarsi white, with black tips. Wings slightly greyish, with several slight transverse brownish marks, and with

two blackish-brown bands; the 1st broad, basal, not extending beyond half the breadth from the costa; the 2nd narrow, entire, near the 1st; veins black; discal transverse vein straight and upright, parted by one-third of its length from the border, and by very much more than its length from the præbrachial transverse vein. Halteres testaceous. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

Singapore.

Gen. *XANGELINA*, n. g. (*Plate I. fig. 3.*)

Fæm. *Corpus* latiusculum, parce setosum. *Caput* antice subdilatum; facies magna. *Antennæ* breves; articulus 3^{us} longi-conicus; arista longa, gracilis, plumata. *Abdomen* brevi-ovatum, thorace non longius. *Pedes* breviusculi. *Alæ* mediocriter latæ; venæ rectæ.

Female. Body rather broad, with a few bristles. Head somewhat dilated in front; face large. *Antennæ* short; 3rd joint elongate-conical; arista long, slender, plumose. *Abdomen* short-oval, not longer than the thorax. *Legs* rather short. *Wings* moderately broad; subcostal vein extending to about one-fourth of the length of the wing; mediastinal extending a little beyond the subcostal; radial ending at about seven-eighths of the length; cubital ending at the tip; cubital and præbrachial almost parallel beyond the discal transverse vein, which is straight and upright, and parted by very much more than its length from the præbrachial transverse, and by much less than its length from the border.

107. *XANGELINA BASIGUTTA*, n. s., fæm. Testacea, scutello fusco, abdomine fulvo, alis subemereis guttâ costali nigrâ venis transversis nigro-sublimbatis.

Female. Testaceous. Proboscis partly brownish. Scutellum brown. *Abdomen* tawny. *Wings* slightly greyish; veins black; a black dot at the tip of the subcostal vein; transverse veins slightly clouded with black. Length of the body 2 lines; of the wings 4 lines.

Malacca.

Gen. *PLATYSTOMA*.

108. *PLATYSTOMA RIGIDA*, n. s., mas. Ferrugineo-fusca, capite subtus albo, antennis piccis, pectore albido, pedibus nigris, alis nigricantibus albo confertim at interruptè guttatis.

Male. Ferruginous-brown, tomentose. Head white behind and beneath, ferruginous and shining in front. *Antennæ* picceous; arista slightly plumose. *Pectus* whitish. *Legs* black. *Wings* blackish, thickly studded with white dots, which disappear at the base and on an undulating band beyond the middle; veins black. Length of the body 3 lines; of the wings 6 lines.

Singapore.

109. *PLATYSTOMA STELLATA*, n. s., mas. Cinereo-nigra, capite subtus albido, antennis fulvis, facie abdominis apice pedibusque nigris nitentibus, alis obscurè cinereis guttis confertis at interruptis limpidis.

Male. Cinereous-black, tomentose. Head shining black in front, whitish behind and beneath. *Antennæ* tawny. *Abdomen* shining black at the

tip. Legs black and shining. Wings dark grey, with numerous limpid dots which are comparatively wanting on a blackish-brown stripe along two-thirds of the length of the costa, and on an exterior upright band which is connected with the above stripe. Length of the body 3 lines; of the wings 6 lines.

Malacca.

Gen. THEMARA, n. g. (*Plate I. fig. 5.*)

Mas. *Corpus* latiusculum, subsetosum. *Caput* thorace paullo angustius. *Antennæ* epistoma non attingentes; articulus 3^{us} lanceolatus, longiusculus; arista latè plumosa. *Abdomen* ellipticum, thorace non longius. *Alæ* latiusculæ, obscuræ, maculis pallidis, venis radiali et cubitali undulatis.

Male. Body rather broad. Head and thorax slightly setose. Head a little less broad than the thorax; epistoma not prominent. Proboscis short. Palpi short, porrect. *Antennæ* not reaching the epistoma; 3rd joint lanceolate, rather long; arista deeply plumose, about twice the length of the 3rd joint. Abdomen elliptical, as long as the thorax. Wings rather broad, dark, with pale marks; subcostal vein ending at much beyond one-third of the length; mediastinal ending at much beyond half the length; radial undulating, ending at about five-sixths of the length; cubital undulating, ending at the tip of the wing; præbrachial and subanal hardly undulating; discal transverse vein straight, nearly upright, parted by one-tenth of its length from the border, and by more than half its length from the præbrachial transverse.

110. THEMARA AMPLA, n. s., mas. Ferruginea, subtus testacea, scutello, abdominis fusi fasciis tribus pedibusque testaceis, alis obscure fuscis, maculis tribus anticis luridis tribusque posticis albis.

Male. Ferruginous, slightly shining, testaceous beneath. Head in front and appendages testaceous. Scutellum and legs testaceous. Abdomen brown above, testaceous at the base and with two testaceous bands. Wings dark brown, with three hyaline triangular spots in front and three on the hind border; the costal spots lurid, the hind spots white. Length of the body 4 lines; of the wings 8 lines.

Singapore.

Gen. STRUMETA, n. g. (*Plate II. fig. 4.*)

Fem. *Corpus* latiusculum, pubescens, vix setosum. *Abdomen* brevi-ovatum, thorace latius et paullo longius. *Alæ* mediocriter latæ, limpidæ, fasciis fuscis, venâ transversâ præbrachiali undulatâ, perobliquâ.

Female. Body rather broad, dull, pubescent, hardly setose. Head rather less broad than the thorax; epistoma not prominent. Proboscis and palpi short. *Antennæ* mutilated in the insect here described. Abdomen short oval, broader and a little longer than the thorax. Wings moderately broad, limpid with brown bands; longitudinal veins almost straight; subcostal and mediastinal veins almost contiguous; mediastinal vein ending at much beyond half the length of the wing; radial ending at a little beyond four-fifths of the length; cubital ending at somewhat in front of the tip; discal

transverse vein nearly straight and upright, parted by full one-fourth of its length from the border, and by about its length from the præbrachial transverse which is undulating and very oblique.

111. *STRUMETA CONFORMIS*, n. s., fœm. Cervina, thoracis vittis duabus, metathorace et pectoris disco nigricantibus, pedibus testaceis, alis limpidis fusco-quadrifasciatis.

Female. Fawn-colour. Thorax with two blackish stripes. Metathorax and disk of the pectus blackish. Legs and halteres testaceous. Wings limpid, pale brown along the costa, and with four pale brown bands; 1st and 2nd bands connected hindward; veins black, testaceous towards the base. Length of the body 4 lines; of the wings 7 lines.

Singapore.

Gen. VALONIA, n. g. (Plate I. fig. 6.)

Fœm. *Corpus* sat angustum, pubescens. *Caput* anticè subdilatatum. *Antennæ* breviusculæ; articulus 3^{us} longi-conicus; arista pubescens. *Abdomen* fusiforme, thorace paulò longius. *Pedes* sat robusti. *Alæ* angustæ, obscuræ, maculis limpidis.

Allied to *Platystoma*.—*Female.* Body rather narrow, dull, pubescent. Head as broad as the thorax, slightly dilated in front; epistoma not prominent. Proboscis and palpi short. *Antennæ* rather short, not reaching the epistoma; 3rd joint elongate-conical; arista pubescent. Abdomen fusiform, a little longer than the thorax. Legs rather stout, especially the hind pair. Wings narrow, dark with limpid spots; subcostal vein ending at before one-third of the length of the wing; mediastinal ending at much beyond half the length; radial ending at a little before three-quarters of the length; cubital and subanal hardly undulating, the former ending at a little in front of the tip of the wing; discal transverse vein straight and upright, parted by less than half its length from the border, and by a little less than its length from the præbrachial transverse.

112. *VALONIA COMPLICATA*, n. s., fœm. Obscurè cinerea, capite testaceo, thorace nigro-punctato, abdomine guttis quatuor lateralibus albis tomentosus subtus testaceo, pedibus fulvis, femoribus posterioribus tibiisque posticis nigris, alis subcinereis guttis plurimis limpidis.

Female. Dark grey. Head and appendages testaceous. Thorax punctured with black; humeral calli black, shining. Abdomen with two white tomentous dots on each side; underside testaceous. Legs tawny; posterior femora black, with tawny tips; hind tibiæ blackish except at the base. Wings greyish, with very numerous limpid dots, blackish and without dots along more than half the length of the costa; veins black. Halteres testaceous. Length of the body 3 lines; of the wings 5 lines.

Malacca.

Gen. SOPHIRA, n. g. (Plate II. fig. 1.)

Fœm. *Corpus* sat angustum, pubescens. *Caput* thorace paulò angustius. *Antennarum* articulus 3^{us} longiusculus, sublanco-latus; arista plumosa.

Abdomen subfusiforme, apice attenuatum, thorace paullo longius. *Pedes* graciles. *Alæ* longiuscule, sat angustæ, venis limbatis.

Female. Body rather narrow, dull, pubescent. Head a little less broad than the thorax; epistoma not prominent. Proboscis and palpi short. Antennæ not reaching the epistoma; 3rd joint rather long, sub lanceolate; arista plumose. Abdomen subfusiform, somewhat attenuated at the tip, a little longer than the thorax. Legs slender. Wings rather long and narrow; subcostal vein ending at before one-third of the length of the wing; mediastinal ending at much beyond half the length; radial ending at about seven-eighths of the length; cubital ending at very little in front of the tip; discal transverse vein straight, hardly oblique, parted by one-fourth of its length from the border, and by very much more than its length from the præbrachial transverse.

This genus seems to be somewhat allied to the *Helomyzides*.

113. *SOPHIRA VENUSTA*, n. s., fœm. Testacea, thoracis fasciâ metathorace abdominisque fasciis tribus maculisque duabus subapicalibus nigris, tibiis fuscescentibus, alis limpidis venis fusco-limbatis.

Female. Testaceous. Thorax with a black band between the wings. Metathorax black. Abdomen with three black bands, and with a black subapical spot on each side. Tibiæ brownish; tarsi tawny. Wings limpid, lurid in front, striped with brown along most of the veins; veins black, tawny towards the base; cubital vein minutely setose towards the base. Length of the body 4 lines; of the wings 8 lines.

Singapore.

Gen. RIOXA, n. g. (Plate II. fig. 3.)

Fœm. Corpus angustum, pubescens. *Caput* sat parvum, thorace multo angustius. *Antennarum* articulus 3^{us} sublinearis; arista raro plumosa. *Thorax* longi. ovatus. *Abdomen* fusiforme, thorace multo angustius, vix longius. *Pedes* graciles, antici breves. *Alæ* longæ, mediocriter latæ, obscuræ, guttis albis.

Female. Body narrow, dull, pubescent. Head rather small, much less broad than the thorax; epistoma not prominent. Proboscis and palpi short. Antennæ not reaching the epistoma; 3rd joint almost linear, moderately long; arista thinly plumose. Thorax elongate-oval. Abdomen fusiform, much narrower, but hardly longer than the thorax. Legs slender; fore legs short. Wings long, moderately broad, dark with white dots; radial vein ending at rather in front of the tip of the wing; discal transverse vein almost straight, very oblique, parted by about one-fourth of its length from the border, and by somewhat less than its length from the præbrachial transverse.

114. *RIOXA LANCEOLATA*, n. s., fœm. Cervina, thorace nigro-quadrivittato, abdomine nigro vittâ dorsali cervinâ, pedibus testaceis, alis nigricantibus strigâ discali guttisque quinque albis.

Female. Fawn-colour. Proboscis, legs and halteres testaceous. Thorax with two blackish stripes on each side, the outer pair shortened hindward. Abdomen black, with a fawn-coloured dorsal stripe which is attenuated hindward, and does not extend to the tip. Wings blackish, almost limpid along the hind border for more than half the length from the base, with a white discal streak and with five white dots; 1st dot in a line with the streak; 2nd very minute,

behind the 1st; 3rd on the costa near the tip; 4th larger, apical, near the 5th, which is on the hind border. Length of the body 5 lines; of the wings 10 lines.

Singapore.

Gen. XIRIA, n. g. (*Plate II. fig. 2.*)

Mas. *Corpus* metallicolor, subsetosum. *Caput* latiusculum. *Palpi* longiusculi. *Antennæ* breves; articulus 3^{us} sublinearis; arista latè plumosa. *Thorax* robustus. *Abdomen* lineare, thorace paullo longius et multo angustius. *Pedes* longiusculi, sat validi. *Alæ* mediocriter longæ latæque.

Male. Body metallic, slightly setose. Head rather broad, hardly narrower than the thorax; epistoma not prominent. Proboscis short. Palpi porrect, rather long and stout. Antennæ short, not nearly reaching the epistoma; 3rd joint almost linear; arista deeply plumose, much more than twice the length of the 3rd joint. Thorax stout. Abdomen linear, a little longer than the thorax and about half its breadth. Legs rather long and stout. Wings moderately long and broad; subcostal vein ending at rather beyond one-third of the length; mediastinal ending at very much beyond half the length; radial ending at beyond five-sixths of the length; cubital ending at hardly in front of the tip; discal transverse nearly straight, slightly oblique, parted by about half its length from the border, and by rather more than its length from the præ-brachial transverse.

115. XIRIA ANTICA, n. s., mas. Purpurea, capite nigro, antennarum articulo 3^o ferrugineo, pedibus testaceis, tibiis nigris, tarsis albis anticis ferrugineis, alis sublimpidis apice nigricantibus maculis costalibus albis et nigricantibus.

Male. Purple. Head and appendages black. Third joint of the antennæ ferruginous. Legs testaceous; tibiæ black; fore tarsi ferruginous; posterior tarsi white, with brown tips. Wings nearly limpid, with two white and two blackish spots on the costa; tips blackish; veins black, testaceous along the costa. Halteres whitish. Length of the body 4 lines; of the wings 8 lines.

Mount Ophir.

Subfam. ACHIIDES, *Walk.*

Gen. ACHIAS, *Fabr.*

116. Achias maculipennis, *Westw. Oriental Entomology*, 38. pl. 18. f. 4. Singapore. Inhabits also Java.

Subfam. DIOPSIDES, *Walk.*

Gen. DIOPSIS.

117. DIOPSIS QUINQUEGUTTATA, n. s., fem. Nigra, proboscide pedibusque fulvis, his ex parte fusciscentibus, alis nigricantibus basi apice guttisque quinque sublimpidis. (*Plate II. fig. 7.*)

Female. Black, shining. Proboscis tawny. Petioles of the eyes about half the length of the thorax. Scutellum with two spines, which are more than half the length of the thorax. Legs tawny, partly shaded with brown. Wings blackish, nearly limpid at the base and at the tips, and with two interrupted nearly

limpid bands, the first of two dots, the second of three dots; veins black. Length of the body 3 lines; of the wings $4\frac{1}{2}$ lines.

Mount Ophir.

118. *DIOPSIS QUADRIGUTTATA*, n. s., mas. Picea, capite oculorum petiolis pedibusque fulvis, his ex parte fusciscentibus, alis nigricantibus basi fasciâ subapicali guttisque quatuor sublimpidis. (*Plate II. fig. 6.*)

Male. Piceous, shining. Head and petioles of the eyes tawny, the latter fully half the length of the thorax. Scutellum with two spines, which are less than half the length of the thorax. Legs tawny, slightly shaded with brown. Wings blackish, nearly limpid at the base and towards the tips, except the extreme part of the latter which is slightly blackish; two interrupted nearly limpid bands, each composed of two dots; veins black. Length of the body $2\frac{1}{2}$ lines; of the wings 4 lines.

Malacca.

Subfam. SEPSIDES, *Walk.*

Gen. CALOBATA, *Fabr.*

119. *CALOBATA CONFINIS*, n. s., fœm. Nigra, capite cyaneo, antennis piceis, femoribus posterioribus albo-cinctis, tarsis anticis albis, alis subcinereis fasciis duabus connexis fuscis, 2^a apicali.

Female. Black, dull. Head blue, shining. Proboscis and antennæ piceous. Posterior femora with a white ring near the tips; hind femora with a white ring at the base; fore tarsi white. Wings greyish, with two brown bands, the first connected on the hind border with the second, which is apical; veins black. Halteres whitish, with black knobs. Length of the body 7 lines; of the wings 10 lines.

Singapore and Mount Ophir.

120. *CALOBATA IMMIXTA*, n. s., fœm. Nigra, capite cyanescente, facialibus atris, antennis piceis, pedibus testaceis anticis nigris, tarsis anticis albis, femoribus posterioribus fasciis quatuor nigris, alis subcinereis fasciis duabus subconnexis fusciscentibus, 2^a apicali.

Female. Black, dull. Head bluish, shining; facia deep black. Proboscis and antennæ piceous. Legs testaceous; fore femora black, testaceous towards the base; fore tibiæ black; fore tarsi white; posterior femora with four black bands; posterior tibiæ dull testaceous, black towards the base; posterior tarsi brownish. Wings slightly greyish, with two brownish bands, the first slightly connected on the hind border with the second which is apical; veins black. Length of the body 5 lines; of the wings 10 lines.

Malacca.

Subfam. PSILIDES, *Walk.*

Gen. MICROPEZA, *Macq.*

121. *MICROPEZA FRAGILIS*, n. s. Fulva, femoribus tibiisque anticis fuscis, tibiis posterioribus basi apiceque fuscis, tarsis anticis posticisque albidis, alis subcinereis guttis tribus apiceque limpidis.

Tawny. Fore femora and fore tibiæ brown; posterior tibiæ brownish at the

base and at the tips; fore tarsi and hind tarsi whitish. Wings very slightly greyish, with three limpid spots forming a curved band near the tips which are also limpid; veins black. Length of the body $3\frac{1}{2}$ –4 lines; of the wings 5–6 lines.

Singapore and Mount Ophir.

Gen. NERIUS, *Wied.*

122. *Nerius fuseipennis*, *Macq. Dipt. Exot.* ii. 3. 241. 1. pl. 325. f. 5.

Singapore and Mount Ophir. Inhabits also Java and the Philippine Islands.

Gen. TEXARA, n. g. (*Plate II. fig. 5.*)

Fœm. *Corpus* gracile, non setosum. *Caput* subproductum; facies brevis. *Antennæ* epistoma attingentes; articulus 3^{us} clavatus; arista pubescens, subapicalis. *Thorax* subfusiformis. *Abdomen* lanceolatum, thorace angustius et duplò longius. *Pedes* postici longi, femoribus incrassatis serratis, tarsis anticis subdilatatis. *Ala* angustæ.

Female. Body slender, without bristles. Head slightly produced, as broad as the thorax; face short; epistoma not prominent. Antennæ extending to the epistoma; third joint clavate; arista minutely pubescent, seated near the tip of the third joint. Thorax subfusiform. Abdomen lanceolate, narrower than the thorax and about twice its length. Anterior legs moderately long and stout; fore tarsi slightly dilated; hind legs long; hind femora incrassated, serrated beneath; hind tibiæ slightly curved. Wings narrow; subcostal vein not extending to one-third of the length of the wing; mediastinal vein not extending to half the length; radial extending to a little beyond three-quarters of the length; cubital ending at very little in front of the tip of the wing; discal transverse vein straight, upright, parted by less than its length from the border, and by about thrice its length from the præbrachial transverse.

123. *TEXARA COMPRESSA*, n. s., fœm. Nigra, capite nigro-cyaneo subtùs cano, antennis piceis, aristâ albidâ, alis subcinereis, halteribus albidis.

Female. Black. Head bluish-black, with hoary tomentum beneath. Antennæ piceous; arista whitish. Wings greyish; veins black. Halteres whitish. Length of the body 5 lines; of the wings 6 lines.

Singapore.

DESCRIPTION OF PLATES I. AND II.

Obs. All the figures are more or less magnified, and the outline-details comprise the side and front views of the head, antennæ, and base of the wings.

PLATE I.

Fig. 1. *Massicyta bicolor*; 1*a*, head seen sideways; 1*b*, the head seen in front; 1*c*, antenna.

Fig. 2. *Zambesa Ocypteroïdes*; 2*a*, head sideways; 2*b*, ditto in front; 2*c*, antenna.

Fig. 3. *Xangelina basigutta*; 3*a*, head sideways; 3*b*, ditto in front; 3*c*, antenna; 3*d*, base of the wing.

Fig. 4. *Xarnuta leucotelus*; 4*a*, head sideways; 4*b*, ditto in front; 4*c*, antenna; 4*d*, base of wing.

Fig. 5. *Themara ampla*; 5*a*, head sideways; 5*b*, ditto in front; 5*c*, antenna; 5*d*, base of wing.

Fig. 6. *Valonia complicata*; 6*a*, head sideways; 6*b*, ditto in front; 6*c*, antenna.

PLATE II.

Fig. 1. *Sophira venusta*; 1*a*, head sideways; 1*b*, ditto in front; 1*c*, antenna.

Fig. 2. *Xiria antica*; 2*a*, head sideways; 2*b*, ditto in front; 2*c*, antenna.

Fig. 3. *Rioxa lanceolata*; 3*a*, head sideways; 3*b*, ditto in front; 3*c*, antenna.

Fig. 4. *Strumeta conformis*; 4*a*, head sideways; 4*b*, ditto in front.

Fig. 5. *Texara compressa*; 5*a*, head sideways; 5*b*, ditto in front; 5*c*, antenna.

Fig. 6. *Diopsis 4-guttata*.

Fig. 7. *Diopsis 5-guttata*.

Note on a supposed species of *Pelopæus*. By EDWARD NEWMAN, Esq., F.L.S.

[Read January 15th, 1856.]

IN No. 59 of the "Proceedings" of our Society is a letter addressed to our Secretary on the economy of a certain Hymenopterous insect as observed by the writer when at Bombay: several of the explanations in this letter require correction, although evidently written in good faith. The description of the insect and its nest is fully sufficient to identify the tribe and even genus: it is one of the *Vespina*, and doubtless of the genus *Pelopæus*: the name of "Mason-bee" is therefore assigned to it in error, because there is a tribe of Mason-bees possessing a most wonderful and interesting economy, and with that tribe the present insect has nothing whatever to do.

In the second place, the male is represented as the builder of the nest,—a statement so opposed to all we know of the economy of *Hymenoptera*, that it may safely be pronounced erroneous; the building insect was certainly not a male, and as certainly a female or neuter.

In the third place, the shining green insect, described as the female, was unquestionably a parasite, probably of the genus *Chrysis*: its presence in the nest of the wasp was as an insidious enemy, not as the legitimate partner and participator in domestic care.

On the Natural History of the Glowworm (*Lampyrus noctiluca*).

By the late GEORGE NEWPORT, Esq., F.L.S. Prepared from the Author's MS.* by GEORGE VINER ELLIS, Esq., Professor of Anatomy in Univ. Coll., London. Communicated by the Secretary †.

[Read December 18th, 1855.]

IN the summer of the years 1840, 1841 and 1842, I devoted a great deal of time to the investigation of the natural history and anatomy of the Glowworm, in continuation of some researches commenced in the country so long ago as the year 1830. These researches had reference more especially to the internal structure of the light-producing organs, and to the origin and nature of the light. But although the structure of the parts concerned was repeatedly and carefully examined, and although the insects themselves were submitted to numerous experiments, I was unable to arrive at any entirely satisfactory conclusion, either with regard to the peculiarities of the structure of the organs, or to the nature of the light which they emit. I felt bound, therefore, to withhold from publication the observations I had then made until such time as I might be able either to enter more fully into the examination both of the natural history of the insect and of its peculiar organization, or to afford such an explanation of the mode of origin and of the nature of its luminous property as would be in accordance with the many facts already ascertained by other inquirers. Some years later, on comparing the results of a series of observations on the habits and anatomy of other insects, and especially of *Meloë*, with the discoveries of Faraday and Matteucci in physical science, I was led to the conclusion that a very close relation exists between the *vital* and *instinctive forces* of the organic world and the physical forces of the inorganic. This view, which was announced in a

* Some additional MS. on the Anatomy and Light of the Glowworm, that is less complete, I hope to be able to communicate to the Society on a future occasion.—G. V. E.

† The materials of the present paper have been extracted from the note-books of the late Mr. Newport by Professor Ellis, of University College. It was evidently Mr. Newport's intention to have continued his observations on this very interesting insect; and there can be no doubt that, had he lived to carry out this intention, the paper would have appeared in a much more complete and elaborate form. But the observations, incomplete as they are, have appeared too important to be left unpublished; and, with this explanation, which is due to Mr. Newport's memory, they are now printed in the Society's "Journal of Proceedings."—SECRETARY.

paper on *Meloë* read to the Linnean Society on the 18th of November 1845, seems to me now to afford a correct explanation of the origin and nature of the light of the Glowworm, and to elucidate facts in the natural history of this and other insects, which do not seem to be reconcilable in any other way. Added to this, I am at length enabled, through more perfect means of microscopic investigation, to supply, from recent examination, facts respecting the anatomy of the light-giving organs and the other structures, which had escaped me in my former inquiries.

I propose, therefore, in this paper to give a full account of the natural history and anatomy of the Glowworm.

NATURAL HISTORY OF THE INSECT.

The Imago.

The Glowworm is an insect which has attracted the attention of our earliest naturalists: it was well known both in this country and on the continent. Although very limited in its geographical distribution, it is usually common in those parts in which it is located.

The period at which the *Lampyrus noctiluca* common to the north of Europe usually makes its first appearance in this country is about the middle of June, after it has undergone its metamorphosis. From that time to the end of June or the middle of July it is found in abundance on grassy banks, in sheltered spots in lanes, and at the sides of hedges, especially on calm dewy evenings. It is most abundant in Kent at the end of June, but in Gloucestershire in the middle of July, and shines most vividly at those times on perfectly calm evenings. Very few are observed to shine on cold rainy nights, and scarcely one is seen to glimmer on a perfectly dry night when there is a brisk cold wind. At a temperature of the air below 58° Fahr., the perfect female is said not to shine, but with that statement my own observations do not entirely agree. It has been thought, also, that the glowworm ceases to be luminous before midnight; but, although the light is given out most intensely and by the greater number of individuals before that hour, yet this is not invariably the case with all, as I have witnessed light emitted by some as late as two o'clock in the morning, and by others until after dawn. The light given out during the first few evenings of the glowworm's appearance is of a faint yellow colour, but after several evenings, if the creature continues to shine, it becomes of a greenish-yellow, and is less intense: this faintness is very marked if the insect has been kept

several days in confinement, and especially when there has not been communion with the other sex. It is given out from the ventral surface of the last three segments of the body, which are almost transparent, and have no dark pigment in their texture; but it is most intense in the anterior half of the tenth and eleventh segments, on each of which it forms two broad bands extending across the whole surface. In the twelfth or last segment it is feeble, and appears merely as two bright spots, one on each side of the surface, and each about the size of a moderate pin's head. The light is most intense in those females which have passed through their metamorphosis only within the last two or three days, and have not yet paired: in these it is sometimes so powerful, that I have been able to read small print for an hour by my watch in the darkest night. It is given forth most intensely in faint flashes immediately the insect becomes stationary after locomotion, and usually when it has crept up a blade of grass, or crawled along a slight eminence in its native haunts; if the insect is watched at that time, it may frequently be observed to coil the extremity of its body upwards, exposing its light most to view, and turning it to the right and to the left, as if to use it as a beacon for the wandering volant male. Even when she is perfectly stationary on the ground for a few minutes, the female rests with the extremity of her body turned to one side, so as still to show the light; though if the male continues absent, she seldom remains long in one place or position, but continues alternately to wander on and to rest, scintillating her light more and more intensely at intervals.

I have witnessed these circumstances repeatedly both in the natural haunts of the insect and in confinement; and am scarcely prepared to regard them as a direct act of the will, but rather as an evolution of instinct through the direct stimulus of vital causes, precisely as I regard what is in like manner believed to be a voluntary extinction of the light (Kirby and Spence, vol. ii.) at the moment of capture or of sudden contact with a foreign body. At the instant of such contact the entire body of the insect is contracted and shortened, more especially on the ventral surface; and not only are the light-giving segments drawn one within the other, but the luminous organs within them are simply removed from immediate contact with the tegument, and are not, as supposed by Murray* and Müller, hidden behind opaque parts: possibly the

* See Murray's *Experimental Researches on the Light of the Glowworm*. Edinb. 1826.

darkness may be also due to the withdrawal of nervous influence and its employment in the action of the muscles; and thus the semblance of an act of volition may be given to what is owing to purely vital and physical causes. This explanation appears probable from the fact that the light is never completely extinguished in the anal segment, in which the organs within are not easily removed from contact with the tegument by the ventral muscles. It may be necessary to bear these circumstances in mind, as we shall find that they are of some consequence with reference to the right interpretation of the nature of the light.

It has been supposed by most naturalists (Kirby and Spence, &c.)* that the production and use of the light have immediate reference to the function of reproduction,—a view in which I entirely coincide, as it is not only in accordance with the facts now stated, but with all the circumstances of the natural history of the insect. It has been objected to this view by some, that the male also is slightly luminous, but this fact in no way affects the conclusion with regard to the female.

The male of *Lampyrus noctiluca*, as every naturalist is aware, is a winged insect with large organs of vision over the greater portion of each side of the head. It is far less numerous than the female, and is very rarely taken, except on calm evenings, while hovering about, or when in company with the females shining most vividly; it is, however, allured by the presence of artificial light (Westwood, Introduction, p. 248). The sole object of its life in the winged state is to search out its partner; and as it takes no food whatever when it has assumed the winged condition, its period of existence is necessarily very brief, for it dies generally after it has paired. The light of the female too, after the union of the sexes, becomes greatly diminished, and soon after the deposition of her ova—a proceeding which occupies a few days—she also perishes; so that in a week or two after the middle of July, when almost every individual has deposited her ova or has died unimpregnated, all traces of the light of the glowworm are extinguished.

Like the females of most insects, the glowworm has her life prolonged for a considerable period beyond that of her congeners, if she has not been impregnated. And the chances that some of the females may not be impregnated are very great, as the males are not only few in number, but their time of appearance, so far as my

* Journal of a Naturalist, 1830, 3rd edit. p. 302; Westwood's Introduction, 1838, vol. i. p. 248.

observations have gone, is very limited ; they are to be found chiefly only on the first two or three evenings after the glowworms have begun to shine, and just completed their metamorphoses, and even then only on warm calm nights. While, therefore, those females which have received the male proceed with the deposition of their ova, their light waning more and more on each evening until at length it ceases with the life of the parent, the unimpregnated females continue to shine more and more vividly on each succeeding night, and their life is prolonged for many days beyond the usual period in expectation of the chance partner that may yet remain. The period during which the glowworm continues to shine is rarely more than from fifteen to twenty days. Its time of appearance and disappearance varies only a few days in different localities, usually from the end of June to the middle of July ; but if in the season of their coming forth the weather is boisterous and wet, not only are fewer individuals seen, but their time of stay is more limited, because many perish early, either at the time when their metamorphosis is about to be completed, and when excess of moisture is exceedingly injurious to them, or during their exposure on the herbage awaiting their partners. Instead of finding them abundant at one spot in such seasons, they are met with but rarely, and are scattered solitarily over a wide extent.

The Impregnation of the Female, and the Deposition of the Eggs.

In the summers of 1840 and 1841 I received from the country, through the kindness of a friend, several collections of glowworms, both in the latter stage of the larva, and in the imago state. With these I was enabled to watch the transformation, to observe the pairing of the sexes, and the development of the ova. Degeer originally watched the metamorphosis, and Martle, with subsequent writers, has given some account of the habits of the larva ; but they left very much to be ascertained. In the middle of June 1841, having then received a collection of both male and female glowworms, and having also by me some other females, reared from larvæ sent to me in the early part of the year, which had not paired, I had the means of watching the whole of their natural history, and the period of the development of the young.

I placed a virgin female, which I knew to be such from having raised it from the pupa only a few hours before, under a glass, and put with it two of the males which I had then just received from the country. This was at six in the evening of the 19th of June.

Within a very few seconds of the occurrence, the males became most assiduous in their attention to the female, and one of them was in contact in from ten to twelve minutes; but it had not remained longer than a minute when it was accidentally removed, and the female instantly passed a single egg. Union was again effected in an equally short length of time, but the female endeavoured to escape, and did not receive the attention of the male as might have been expected; in a few minutes, however, she became more quiet, and the male remained in contact. This second attachment commenced at exactly sixteen minutes after six P.M.; and the temperature of the atmosphere was then 66° Fahr. in the open air—the evening being moist but warm. The glowworms continued in contact for fifteen minutes, when the female began to crawl about, actively dragging after her the male, which maintained his attachment, though he lost it once for a few seconds; and while thus attached, the antennæ of the male were thrown backwards, and the head was drawn along under the thorax. The sexes now continued united for an hour and a half, and then separated naturally, the impregnation appearing to have been complete. At fourteen minutes before eight P.M. I placed them in a box, the bottom of which was covered with damp earth with a little tuft of grass, for the purpose of observing the time and mode of depositing the eggs. I now placed the vessel in the open air, covered with a thin gauze net to prevent the escape of the insects; the female continued for nearly an hour to crawl about on the grass and on the earth, still emitting her light, but with only moderated brilliancy, while the male was concealed beneath the grass and remained perfectly quiet as in repose. At five o'clock on the following morning, when the temperature of the air was about 60° Fahr., the female continued in motion with the male still flitting about her, but the two were not in contact. I now examined the vessel and the tuft of grass very carefully, but no eggs had yet been deposited. I then covered the vessel, so as to exclude light as much as possible, and placed it in a dark room. At eleven o'clock in the day, when the atmosphere was at 65° Fahr., the male was still in occasional attendance on his partner, but no eggs had yet been deposited by her. During the remainder of this day and in the evening, the attention of the male was undiminished, but on the following morning I found him dead. The female, however, did not begin to deposit her eggs until the next evening. The conclusion to be drawn from this experiment seems to be, that, though the female is impregnated at an early period after

quitting the pupa state, the eggs may not be deposited for twenty-four to forty-eight hours after impregnation.

In the following year (1842) I had an opportunity of repeating this observation. Having carefully preserved some larvæ of the glowworm through the preceding winter and spring, and succeeded in rearing pupæ and perfect insects from them, I found on the morning of the 18th of June, the temperature being at 67° Fahr., that four female glowworms had assumed the perfect state, and that two of these had begun to shine very brilliantly. There were also two male insects; these had not yet assumed the perfect form, but were still pupæ; and as the whole of these had entered the pupa state about the same time, it would seem that the males remain longer in that condition than the females. During the night between the 20th and 21st of June, the two males also threw off the pupa-covering, and their elytra remained soft and pliable, being liable to injury for several hours. On the evening of the 21st, the males began to pay attention to the females, and on examining the insects at five o'clock on the following morning (June 22nd) I found them *in coitu*; at three o'clock in the same afternoon, when the temperature of the atmosphere was 70° Fahr., the boxes which contained the glowworms having been placed in a dark closet, they were still attentive to the females, and I found that some eggs had been deposited at the roots of the grass. One of the males was very attentive to the female that appeared to have deposited the ova. This female was shining much more brilliantly than the others. The fact of eggs having been deposited by one of these females within a very few hours after copulation, while in the former case eggs were not produced until nearly two days had elapsed, seems, when the relative time of the females leaving their pupa state is considered, to confirm the conclusion above stated, namely that when the female has been abroad for a day or two before being impregnated, the ova, being already fully matured, are then deposited very soon after the communion of the sexes; while, if the female is brought into contact with the male very quickly after leaving the puparium, the ova may not be deposited for one or two days afterwards.

The deposition of eggs, which had commenced on the 22nd of June, as mentioned above, was continued: at half-past ten on the morning of the 24th, when the temperature of the atmosphere was about 65° Fahr., I found that an abundance of eggs had been deposited. A few of these were on the stems and blades of the grass, but by far the greater proportion on the small exposed root-

fibres; this, therefore, appears to be the habit of the insect. The males continued to pay attention to their partners, which were still engaged in the act of deposition, so that repeated impregnation may be necessary, perhaps, for the full impregnation of all the ova. On the 25th of June, at ten A.M., I removed some of the eggs to a glass tube, closed at each end by a cork, for the purpose of observing their development; as there is some difficulty in doing this when the eggs are repeatedly exposed in the observations.

I now observed that the males were beginning to pay less attention to their partners; so that the season of shining is followed quickly by that of pairing and the deposition of the eggs; and when the latter takes place quickly after pairing, the female has already been in communication with the male, or has been for some days abroad.

On the 26th of June, in the afternoon, when the temperature was near 70° , all my glowworms, both male and female, were still living, but the former ceased to pay any attention to the latter, and these were not depositing any ova.

On the following day, however, June 27th, a few more eggs were deposited, and one of the males was again attending to and flitting about the female; but after this day all further attention entirely ceased, and the males died. The light of the females also became exceedingly faint, and was shot forth only feebly at intervals. In a few days these also died. I am not prepared, however, to state whether these invariably die after depositing their ova, as I believe, or whether they continue to feed and live on until the following year. It is quite certain that they take some nourishment in their perfect state, but this is not the case with the male.

In connexion with the deposition of the ova, it is interesting to mark the way in which that process is conducted when the union of the sexes has not been effected. Thus, if it happens from the absence of males that the glowworm has not been impregnated within two or three days after quitting the pupa, the light is given out for one or two evenings with increased intensity, and is constantly exposed to view in the manner before described; whilst the insect appears to be greatly excited, and alternately moves from place to place, resting on the ground or climbing to the extremity of blades of grass, changing the position of her body and the light, and shining with greater brightness, but no eggs are deposited. Like many other insects, and more especially the females of some *Lepidoptera*, the glowworm retains her eggs for a

very long time when unimpregnated ; and if at the end of several days impregnation has not occurred, the natural instinct of the creature becomes markedly affected, precisely as I formerly pointed out is the case with the female *Meloë* under similar circumstances (Linn. Trans. vol. xx. p. 302). Her body becomes greatly distended by the fully matured ova within her ; the light loses its brilliancy and is less constantly exposed, and its colour is changed to a greenish hue. She wanders about, with evident distress, less rapidly, but more constantly, and ultimately deposits her eggs at random on the grass over which she travels, or even on the ground, one or two at a time. A very slight mechanical stimulus of touch or pressure on her body will then occasion her to extrude an egg, but nevertheless she is extremely tenacious of life, and lives on until very many of her ova have been carelessly extruded and scattered. After some time she dies. In one experiment made to ascertain the length of time the glowworm may live unimpregnated, I found the light given out with greater brilliancy on the second evening after the glowworm had been in confinement ; with still greater on the third and fourth, at which time the little prisoner was evidently in great distress, alternately traversing the sides and bottom of the box in which she was confined, then remaining stationary for a few minutes and emitting her light with its utmost vividness,—it being at one moment very bright, and then slightly dimmed for a few seconds, but only to be shed again at the next instant with greater brilliancy. The insect was strongly attracted by the light, first to the one side and then to the opposite ; and the sexual impulse was manifested by the frequent protrusion of the vaginal portion of the body. On the fifth evening the light had become fainter ; and from this time to the tenth day, when the insect died, the light continued to diminish in brilliancy, and became of a much greener colour.

At the moment of the laying of the eggs, each is covered with a very glutinous and adhesive matter, as I have found when an egg has been extruded from the body beneath my eye under a lens. They are affixed firmly by means of this matter to the small exposed roots or the base of the stems of blades of grass, though not in the ground as some have stated, but close to the surface ; so that, without being covered by the soil, they are constantly retained in a humid locality, and yet are freely submitted to the influence of heat and air,—conditions which I have constantly found absolutely necessary for their development. Some naturalists have stated that they are usually deposited on moss ; but this condition,

I believe, is not usual. I have always found my specimens in confinement attached as stated to the exposed roots or stems of grass, whence the larvæ, when hatched, are most likely to find their prey near to them, and where they are constantly in a damp place, and in a situation in which all their requirements are best supplied.

Supposed Luminosity of the Eggs.

It has frequently been stated that the eggs are luminous, but of the truth of this there is considerable doubt (Rogerson, Murray, Tiedemann): they certainly are slightly effulgent soon after they are deposited, but this, I consider, is due rather to the matter with which they are covered when extruded, than to any inherent property of their own. With the view of ascertaining the truth of the statement, I have examined the ova both within and without the body. In the female which had died unimpregnated on the tenth day after capture, the ovaries were filled with ova, and when placed in water before removal from the body appeared to emit a greenish light; after three hours' immersion they still appeared, when the specimen was carried into a dark room, to give out a very faint greenish light; but when they had been standing a few hours longer in the water, no light was perceptible from them: the light appeared to have been due to what was transmitted through them from the segments. I then opened the body of a female that was still living, but which had deposited a large proportion of her eggs; and on carrying the specimen into a dark room, the remaining ova appeared to be luminous, like the preceding; the specimen was then immersed still living in water, and the ova appeared to be more luminous than before. The entire ovaries containing the ova were next removed from the body beneath water, placed in a separate vessel, and carried into a dark room, but no light was then emitted by them. They were as opake as those of other insects; so that the light which they appeared to give out before removal from the body, was due in reality to that of the light-giving segments, being transmitted through them. The segments themselves, after the eggs were removed, still emitted light very powerfully, although immersed in water, and continued to do so for nearly five hours, while the insect lived, and almost as brightly as when the insect is uninjured. In a third instance, which was examined at the same time as the preceding, I found the ovaries, when opened in the air, full of ova, but these were not luminous. On placing the insect in water, the eggs then appeared to give

out a faint light, but after immersion for an hour or two they ceased to shine. When the ova and ovaries were removed, I found that the segments gave out only a very faint light, although the insect was still living, and light continued to be given out from them for several hours, but very faintly. It was thus evident to me that the ova which are within the ovarium certainly do not emit light before deposition, but merely transmit that of the segments beneath them; but when the ova are deposited, I am inclined to admit that a very slight luminosity is sometimes apparent, though this is due rather to the fluid covering of the egg than to the egg itself.

The Development of the Embryo.

I have stated that some of the eggs deposited between the 22nd and 25th of June were removed into a glass tube, still attached to the roots of grass to which they had been affixed. This was done in order that the eggs might not be affected too much by warmth and dryness during examination, as when they are long exposed, or have not sufficient moisture, they quickly dry up and are destroyed. If, however, they are enclosed in a tube, and the interior of the tube only very slightly moistened occasionally, then the eggs become developed as in the natural haunts. I did not observe the development of the young *Lampyrus* within the eggs, as opportunities were wanting for my so doing, but only watched that of the egg itself, and the time of appearance of the young. The tube with the eggs was placed in the same box and under the same circumstances precisely as some of the same brood of eggs which still remained attached to the roots of grass. In both these sets I found that at about the 25th or 28th day after the eggs had been deposited they were considerably enlarged,—a certain sign that their development was in progress; this increase was very distinctly marked at this time, viz. about the middle of the period of development of the embryo, in accordance with what I have before and since observed in the development of other species of insects and in other broods of eggs of the glowworm itself, as well as in the *Iulidæ* (Phil. Trans. 1841).

On the 7th of August I had the satisfaction to find that the eggs in the tube, which had been deposited between the 23rd and 25th of June, were producing their larvæ. I had been prevented during the interval from watching minutely the daily progress of the eggs, and I am unable to detail the steps of the formation in

this insect: I had noticed only that the egg had considerably increased in size, but had not in any way changed its colour. It, however, appeared now to be slightly effulgent on the day before the young appeared,—a phenomenon which I subsequently found to be attributable to the embryo within. I saw one specimen immediately after leaving the ovum: at first it was coiled up and inactive,—a circumstance which I attribute to its being still enclosed in the amnion after the shell has burst. It was then of a very delicate straw-white colour, and for a few minutes quite inactive: as soon, however, as its body is stretched out and the amnion removed, it begins to move very feebly, but after a short time with more strength. Its colour also begins to change, the white becoming of a darker shade, and in less than half an hour the whole body is tinged of a very light grey. In the course of two or three hours this colour becomes much darker, and after some hours longer it is of a dull black, like the body of the parent. Its body is then composed of thirteen segments, including the head, and it moves with considerable activity; its onward motion being mainly effected by means of the anal segment, which serves the purpose of the prolegs of herbivorous larvæ in assisting the progress of its body.

The length of time which these eggs had occupied in development was thus on the average about forty-five days, or a little more than six weeks. The other specimens, which had remained in the box attached to the roots of grass, were hatched in about the same time; but the period of incubation was shorter by ten or twelve days than that occupied in the development of a brood of glow-worms' eggs in the preceding year, when the temperature of the season was very much lower with rain.

During the time the specimens above referred to were in course of development, the heat was above the average, for at the latter part of the time on one day it was 86° , and on more than one it ranged from 76° to 78° Fahr. This result agrees with that derived from the observations I have before and since made, viz. that the more or less rapid development of the embryo is mainly dependent on differences in the amount of heat supplied to it from without.

The Food and Habits of the Larva.

Six days after the larvæ were hatched, I supplied them with their proper food—a portion of a living snail, which they immediately began to devour with great avidity. Before this they had sipped

the water added to the interior of the tube. The proper food of the larva was ascertained first, I believe, by Rogerson (*Philos. Mag.* vol. lviii. p. 63), who is quoted by Murray, in the year 1826; it was afterwards pointed out by M. Maille in the '*Bulletin Soc. Phil.*' Feb. 1826, also in the '*Annales des Sciences Naturelles*,' vol. vii. p. 353, and since then by a writer in the '*Penny Cyclopædia*.' The fact has since been re-stated and established with additions, by Rennie, in 1831*. Rogerson stated that the larvæ "feed on small snails, and the carcases of insects, &c."

At the end of eighteen days the larvæ were still very active, and had grown considerably, but had not yet shed their skins; they had been fed during the interval on portions of a snail. On the following day (August 26th), or nineteen days after hatching, one specimen underwent its first change in casting off its skin, but exhibited no change of form. When the larva first escapes from the egg, the only change it experiences is that of colour: it becomes of a deep grey-black, with the margin and posterior angles of the segments of a whitish colour, and with a distinct white line along the middle of the back in the line of the dorsal vessel. After the first change of skin, the whole of the upper surface of the body becomes of a much deeper colour; the longitudinal line almost entirely disappears, and the angles of the segments are then white, and have also a reddish or flesh-coloured spot at the apex.

On the 15th September, or nineteen days after the first change, some of the specimens cast their tegument a second time, while others had only then just entered their first period, although the whole had been living under like conditions. I have constantly noticed similar differences, and am strongly induced to refer them to original imperfect impregnation of the ovum.

I had thus traced the individuals I had watched from the egg, to the second change of tegument in the middle of September, when by accidents most of them died; and I was forced to continue my observations on other specimens which had been supplied to me from their native haunts in the beginning of October.

A full account of the habits of the Glowworm was first given in the '*Bulletin Soc. Phil.*' Feb. 1826, and subsequently in the same year in the '*Annales des Sciences Naturelles*,' vol. vii. p. 353, and these memoirs are attributed to M. Maille. Rogerson, however, as mentioned before, had given a brief history of the insect, and had already shown that it feeds on snails. A particular account of the cleanliness of the larva is given in the '*Bulletin des Sciences*

* *Journal of the Royal Institution of Great Britain*, vol. i. pp. 16 & 19, 1831.

Naturelles,' June 1826, vol. viii. p. 296; and the same is also referred to by a writer in the 'Penny Cyclopædia,' in which are given some additional accounts of the voracity of the creature and its mode of feeding.

I am not aware, however, that any one has made observations similar to some which have been reported to me in a letter dated August 23, 1840, by my friend Professor Ellis. The writer in the 'Penny Cyclopædia' states that he kept the larvæ alive for a long time, and that they subsisted upon snails: "Attacking those of the largest sort sometimes, they would seize a snail whilst crawling, and when the snail retired within its shell they would still keep their hold, and allow themselves to be carried into the shell with the snail; and although they became enveloped with mucous secretion, it very seldom appeared to adhere to their bodies." Mr. Ellis wished to observe the proceedings here described of the larva being carried into the shell by the snail, and therefore furnished snails to some larvæ that he had in confinement. He was not able to verify the statements made by the writer referred to. On the contrary, he says: "Instead of witnessing that effect, I was astonished to find that the manner of destroying the snail was by a series of sudden bites, repeated at intervals; and I was moreover struck with the fact that the snail seemed in extreme agony after the first bite. I therefore made a number of experiments with snails, and the following are the results:—

"*Exp. 1.*—A rather large snail was bitten; it retracted after the wound of the glowworm into its shell, and had afterwards a partial paralysis (if I may so speak), inasmuch as it could not right its shell when crawling.

"*Exp. 2.*—Another, bitten in the horn, was not able, or did not protrude it fully for as much as a quarter of an hour afterwards; and put out only one (the opposite) for some time.

"*Exp. 3.*—Some smaller snails, bitten once by a large larva, never emerged from their shells afterwards, and it is now *eight* hours since, while one or two seemed to be dead.

"Perhaps you may think these effects are due to mechanical injury. I kept this also in view, and pierced some of the snails when crawling through and through with a needle, and fastened them thus to the table; but although they retracted into their shells as much as possible for the time, they came out again directly afterwards, and were to all appearance as well and active as ever—even those that had been impaled three or four times. These effects cannot be simply those arising from mechanical injury,

seeing the difference in the results. I therefore infer that there is some special poison inserted, or influence exercised, at the time of striking the prey, like that of the snake-tribe; and that the effect on the snail is proportioned to its size, for it takes repeated bites to kill a large one. I am further confirmed in this opinion by the fact that, when a dead snail is presented, the glowworm simply begins to eat slowly. The way in which the glowworms remove the snail, when killed, is interesting: they walk backwards with it, using the claws (prolegs) at the end of the tail as feet."

These interesting facts, communicated to me by my friend Professor Ellis, immediately led me to watch the proceedings of the glowworm. I had the gratification of witnessing every particular, and the opportunity of confirming what he had pointed out, as he had forwarded to me with the glowworms some of the same species of snail as those employed by himself. These snails proved to be the *Helix nemoralis*, and were mostly young individuals; but there were also some full-grown ones, and besides them was a small specimen of *Limax agrestis*. As a general result, I found that the larvæ attacked most fiercely and fed upon the former species of snail most voraciously, but would not touch the latter; their proper food therefore appears to be the *Helices*.

On repeating these observations, I at first thought that it was only the smaller snails which fell a prey to this larva, but I soon found, as stated by the writer in the 'Penny Cyclopædia,' that the very largest are also destroyed by it; for I have seen the full-grown and largest-sized *Helix* attacked by a single larva. I have not, however, seen the larva actually drawn into the shell by the snail, as mentioned by M. Maille, and I therefore suspect that was an accidental occurrence which is likely to happen, since the mode of attack, as M. Maille states, is by sudden bites, repeated, as my friend observes, at intervals, and, as I myself noticed, made by the larva with apparently great caution. So far from the larva being drawn into the shell by the snail, I have noticed that the frothy matter that is invariably given out by the snail when it returns into its shell after being bitten by its assailant, is particularly avoided by the larva. I witnessed the attack of a larva on a very large and full-grown snail while crawling. The larva raising the anterior part of its body made one sudden and very cautious bite about midway in the body of the snail on the margin of the foot, and repeated this by running backwards and forwards from the tail to the head of the snail. At each bite the snail seemed to be in great agony, and a greenish transparent fluid was

instantly exuded from each wound. In this way the larva continued its attack on the snail, running along the side of it from tail to head and back again, repeating its bite at each turn as the snail crawled along. It seemed to direct its chief attacks against the head of its victim, and in this it succeeded in two or three attempts. Once the snail was bitten at the base of one of the large feelers, and the effect was inability to protrude the organ to its full extent. I then placed this snail aside until the next day : although it had been the object of repeated attacks it was not killed, but only appeared to be a little paralysed. These experiments were made on the 27th of August, when the larvæ were in full activity. On the following afternoon I found that the specimen set aside had really been more injured than at first appeared ; it moved very feebly and slowly, and was unable to protrude the feelers on the injured side of the body to their full extent. The inferior margin of the body from the head to the posterior extremity of the foot was unused, irregular and shrunken, and the entire animal had evidently suffered greatly in health ; it appeared to be highly sensitive to light. I then placed near it a large larva, by which it was immediately bitten in the inferior horn on the left side, and the snail retired into its shell. Before it could withdraw itself completely, it was again struck in the margin of the foot on the right side, and the larva then passed quietly to the opposite side and wounded it there also ; then, just as the snail was about to reappear, bit it again twice, first in the inferior, then in the superior horn of the right side ; and when the snail made an effort to protrude the left horn, which had never recovered its original power, wounded it again in that also. After this, it was struck again on the margin of the foot on both sides, and the snail then seemed to be entirely incapable either of completely withdrawing itself within the shell, or of locomotion and attempt to escape. Its body soon appeared shrunk and corrugated, and writhed as if in great agony. It occasionally protruded a very small portion of its horns, but it seemed to have lost all power to project them to their full extent, the utmost length being then not more than one-half that of their original dimensions.

It was interesting to observe with what apparent caution the glowworm proceeded with its work of destruction. It protruded its head to the greatest extent from the thorax, extended its body backwards, and flexed and affixed it firmly by its prolegs, so as to obtain as it were a fulcrum against which it might direct its whole strength in the attack. When I removed the snail, in order

to learn whether it would ultimately recover from its injuries, the larva seemed perfectly disconsolate, turning its head about with extended mandibles in every direction, and watching like a dog at fault. A second snail was then supplied to it, which I shall designate

No. 2.—This also was a snail of the very largest size and perfect health. The instant it had left its shell and began to crawl freely along, the larva attacked it: it was bitten once in the inferior horn of the right side and immediately drew itself within the shell, but almost as quickly came forth again, though it did not protrude the horn. In a few minutes the snail had regained its full power of locomotion, and crawled slowly along, yet apparently in agony. The larva then ran quickly backwards and forwards at the side of its victim, with its head and mandibles extended, and watching for a proper opportunity to strike it again: it next passed backwards to the side of the snail as this creature crawled forwards, and suddenly struck it again in the under lip. The snail instantly retracted, and before the larva could disengage itself, drew it within the shell for a short distance; but this was evidently accidental, as the latter let go its hold, and, affixed by its prolegs, awaited the onward movement of the snail again. After this it gave its victim another severe wound, and the snail withdrew itself entirely. The larva appeared to search eagerly about for its lost victim, first in one direction and then in another. Soon after this it bit the snail within the shell, and this wound had the effect of occasioning the creature to protrude itself, and again it crawled along, the larva following in its track.

Observing how little injurious effect was produced on the snail by these repeated attacks of its assailant, I began to suspect that if the injury to the snail depended on the effect of any specific poison injected into the wound at the moment of striking it, that by the repetition of attacks on the snail No. 1, the virulence of the poison might have become exhausted, and the bites on this one therefore produce but little injury. Accordingly I removed this larva, and placed a second one in its stead to attack the snail, and certainly the result which followed the bites of this second seemed in some measure to justify the supposition. No sooner had this larva been placed near the snail than it struck it repeatedly in the head, the snail retracting at each attack, and appearing to suffer much more severely than from all the attacks of its first assailant: each wound appeared to be equally severe, until at last the snail shrunk into its shell. It did not appear, however, to be

able to remain within the shell more than a few minutes after being wounded, as it seemed to writhe in agony from the bites. These observations therefore do not seem to support the statement, that it is usual for the larva to be drawn by the snail into its shell; on the contrary, the instinct of the larva seemed to lead it to avoid this interruption to its attack, as before striking severely it invariably affixed itself firmly by its prolegs and curved the posterior part of its body in the form of an arch, as if for the purpose of affording a means of support, and allowing the entire body to be suddenly extended forwards to reach the object of its attack. On one or two occasions, when the larva made a very fierce bite, and struck its mandibles deeply into the wound as the snail was crawling at full length out of its shell, the larva was dragged along for a short distance, but I never saw the creature drawn into the shell by the snail. I now set aside this individual like No. 1, and placed a much smaller snail with the larva first employed. This I shall call No. 3. The size of this snail was not greater than that of a large pea.

No. 3.—The larva bit this snail once, and the effect was immediately evident, although this creature had so repeatedly bitten the larger snail; yet the power of locomotion was not destroyed. The specimen No. 4 was next exposed to this larva: this was rather larger than No. 3: it was bitten once in the head and retired within its shell. At the expiration of one minute it came out again, but its power of locomotion was affected, and it was unable to protrude its left horn. I now allowed this snail to be bitten by another larva which had not been employed before, and which was rather smaller than those before used: the snail was bitten once by it and withdrew itself, and seemed to exhibit effects of something more severe than the simple wound. This snail I put by like the former.

Another specimen, No. 5, was now employed: this was rather larger than the two preceding, but not so large as the first two; it was also bitten once by the larva last employed. This specimen as yet had been perfectly uninjured. The larva seemed voracious and active; it bit this specimen slightly at the extremity of the foot, and I allowed it to bite again the head and neck. The snail, when bitten on the head, instantly retired and threw out abundance of froth; it soon emerged from the shell, and attempted to crawl, but it was unable to keep the shell upright on its back; it then retired within, and again came forth from the shell with apparently a little more power. I then allowed it to be bitten

again on the mouth, and it again withdrew itself. By this time it was evident that the snail was much injured, and I allowed the larva to feed upon it.

I then placed a healthy snail, No. 6, about the size of those just noticed, and allowed this to be bitten once by a fresh and hitherto unemployed larva. The wound in this was in the head: the snail withdrew into its shell and never came forth again; and two hours afterwards I found that it was completely dead. This experiment induced me to think, with my friend Professor Ellis, that the bite of the glowworm is peculiarly poisonous to the snail, although I was uncertain in what way it produces its effect. It was evident from all the previous observations, that, even after the first bite from a larva that had already expended its force on other snails, the bitten snail writhes and seems to be in great agony; and if a young individual, it often dies from this single wound in a state of contraction or kind of convulsion, giving out at the time a sanious fluid.

The circumstances noticed in these detailed experiments with regard to the little effect produced on different snails by the same larva which had previously bitten many successive times, and the very marked result which instantly followed the bite of one which had not before been employed, seem to support the opinion that a fluid, which is poisonous to the snail, is injected into the wound by the larva at the moment of its bite, and that the effect produced is diminished in the ratio of the number of times the larva has already bitten: precisely as in poisonous snakes, in which, as also in the glowworm, we may suppose the want of power to produce death may be due to exhaustion of the supply of their secreted fluid, or to its imperfectly matured secretion and dilution with other fluids.

I may mention here, in support of the view that a poison is injected, that I have noticed, on watching some larvæ which were preparing to attack the snail, a transparent fluid oozing from its mouth and extended mandibles. Whether this fluid is secreted by distinct poison-glands, as is the case with the centipede and with serpents; or whether it is merely a profuse flow of saliva, which may act as a poison on the prey, is yet a subject for inquiry. Certainly such a fluid is produced, and the mouth of the glowworm is filled with it to overflowing at the moment of its attack. I have witnessed the same thing in the *Carabidæ* and in the *Silphidæ*, both of which generate an abundance of dark-coloured fœtid fluid from the mouth at the time they are feeding, though this I am

inclined to regard as the proper saliva of these insects. At one time I thought I had detected two poison-glands, in the form of two sacculated salivary vessels, in the perfect female glowworm, but I was not able to confirm this dissection in other instances. It is not improbable that the fluid exuded by the mouth may be secreted by the stomach; as in one instance, while a larva was attacking a large snail, I observed that its mouth was flowing with a blackish fluid which it subsequently regurgitated in considerable quantity. It was similar in appearance to the fluid ejected from the salivary glands or the stomach by the larva and imago *Carabi*; and it seems probable therefore that the fluid of the *Lampyrus* is of the same kind.

That the effect of the bite on the snail was not simply that of mechanical injury, I am of the same opinion as my friend above quoted, since, like him, I struck several snails through in every part with a needle, and wounded them ostensibly far more severely than did the larva; and yet they appeared not to suffer half so much inconvenience, nor give evidence of agony by their peculiar contortions, but moved away with as much activity as before: their movements were not in the slightest degree impeded. One snail, which I repeatedly struck through the head and neck, and impaled on the table, seemed quite unaffected when released, and appeared, if there was indeed any difference in its speed, to move a little quicker. Even although I pierced this specimen through the head twice, close to the cerebral ganglion, it did not appear to be seriously injured: it withdrew for an instant within its shell, but soon came forth again and moved away with as much ease and speed as before, and was alive and apparently quite well on the following day. Another and much larger snail, pierced twice through the stomach and head, crawled away as readily as when uninjured; but when this same specimen was afterwards bit once by a larva which was only of moderate size, the snail withdrew into its shell, and was completely dead within two hours.

Although the mechanical injury inflicted by myself on this last snail had not produced any marked result, the effect from the bite of the larva of the glowworm was instantaneous, and reminded me strongly of the action of some deadly poison injected into the body of a vertebrated animal, as that of the viper, &c., only that it was more rapid and approximative to the effect of an electric shock.

The repetition, extension, and variation of the experiments of Professor Ellis prove:—

That the single bite of a larva of the glowworm will infallibly

kill a small snail, of about the size of a large pea, in less than two hours.

That two or three bites are usually required to kill a snail about the size of a small bullet.

That the effect produced by the bite is not that of mere mechanical injury. Nor does it appear that a bite at one spot is more fatal than at another; for although the larva usually attacks the head of the snail, it wounds it in other parts also with similar results. But if the snail is very large, instinct prompts the glow-worm to bite it two or three times at the foot, before venturing to strike it on the head.

That even when the snail is twice pierced through its head with a needle near the cerebral ganglion, or through its body, but little effect is produced, though when this same snail was bitten by the larva it was dead in two hours.

That when two small snails about the size of grapes were employed, one being pierced through and through with a needle, and the other not so injured, but bitten once only by a large larva, both snails immediately retired into their shells; and that whilst the bitten one never came forth again and was nearly dead at the end of two hours, the other snail was alive and apparently well on the following day.

I noticed also that, although a snail may be bitten once by a small larva and not appear at the time to have been much injured, yet it frequently dies after some hours. This fact still further tends to support the view that some poison is injected, or some serious derangement of the vitality of the snail is occasioned at the time of inflicting the wound, and to confirm it in a negative way by the fact, that if the larva be allowed to exhaust its force, of whatever nature this may be, by repeatedly biting a snail, and then be employed to wound a very much less snail, the effect it produces is far less marked than if it had not previously bitten any.

What is the nature of this influence? Can it at all resemble that of the shock of the electric eel or of the torpedo, both of which we know become exhausted by the repeated use of their power; or can it resemble that of the ray or stinging skate, which is believed to inject a poison with its sting?

But although the effect is fatal to a small snail, even when the larva has previously exhausted its force, it is yet exceedingly slight in the latter case, when the creature is allowed to strike a large snail. On one occasion I employed a full-grown larva which had been used before, to attack a full-grown *Helix* that was as

large as a walnut: the larva struck it repeatedly without killing it. I saw the creature wound the snail at least from thirty to forty times. On the following day the snail was living and able to crawl, but was so much injured that it was unable to balance its shell, and moved along with it tilted on one side. Its progression also was impeded, for it moved very slowly, and kept its feelers depressed, and nearly close to the table over which it was crawling, as if looking out to avoid danger, moving one horn on one side and then the other on the opposite. This was twenty-four hours after it had been injured. I next put a very healthy full-sized larva to attack it. At first the snail did not appear to recognize the danger, and actually crawled over the back of its enemy; but very soon its danger seemed to become known. It appeared to recognize its foe, and continued to crawl round him in a circle, even when placed in a straight line before the larva, as if to avoid the danger. The larva soon bit it on the head, and the snail drew back, but not into its shell; a second wound was then made in the foot. On examining the wound with a lens, after each bite, I observed some dark-coloured sanious fluid upon it, such as I have seen flowing from the mouth of the larva.

From what I have above stated, it will be seen that it is by no means a common occurrence for the larva to allow itself to be drawn by the snail into the shell, since it usually attempts to retain firm hold, by means of its prolegs, of whatever it may be moving over, before striking its prey; but it is occasionally drawn into the shell when it attacks large individuals. I saw one larva bite a large snail fiercely in the head while the snail was crawling, and as the wounded animal instantly withdrew itself before the glowworm could detach itself, the latter was drawn more than half its length into the snail's shell, and had its head and body compressed by that of the snail. This position, as appeared from the struggles and rotation of the body of the larva in attempting to relieve itself, was by no means agreeable; and it came forth covered with slime, and apparently not disposed to return very soon to the attack. On another occasion, when the snail, unconscious at first of the presence of its enemy, slowly crawled over it, and covered its whole body with slime, the insect withdrew, and did not return to the attack until it had rid itself of its filthy covering.

The Voracity of the Larva.

The voracity of the larva of the glowworm is extreme. When they are only about half-grown, they will attack fiercely any new

victim that may chance to be crawling near them, even though they may have fed plentifully on their prey but a few minutes before. Having killed a snail, they seldom leave it, except for a few minutes, until the whole of the body is devoured. They will remain for many hours with their heads buried in the body of the snail, gorging to the utmost, and plunging their small heads and erected mandibles into its viscera, which they continue to pierce and exhaust until all the juices of the body are drained. I have sometimes seen four or five larvæ crouched one upon the other, in a snail-shell, feasting and gorging upon their prey. In this latter respect they somewhat resemble in habit, as they do in general appearance and colour, the voracious larva of the Lady-bird (*Coccinella*) which preys upon *Aphides*. The glowworm larvæ will pertinaciously continue to attack and devour the snails until they are so completely gorged, that they can move but with difficulty, and yet at the expiration of half, and sometimes even but a quarter of an hour, during which they are motionless, as in sleep, or as if fatigued, they will return to their feast as voraciously as before.

Cleanliness of the Larva.

Although the larva manifests such an avidity for food, and continues to gorge itself so long and so pertinaciously, with its head thrust into the snail, and its body buried in the shell amidst the decomposing corporeal elements, it is nevertheless very diligent to cleanse itself of the slime. M. Maille (*loc. cit.*) first mentioned this circumstance, and pointed out the organs which it uses for that purpose. Degeer, however, long ago referred to the structure, but did not observe its use.

After the larva has finished its repast, it leaves the snail, as I have seen, retreats a short distance beneath the roots of grass, and begins to cleanse itself from the adherent slime. This process is effected, as mentioned by Maille, by means of the anal prolegs, protruded from the thirteenth segment, which I shall more particularly describe hereafter. With this apparatus, which the author referred to says is "*une espèce de houppes nerveuse composée de 7 ou 8 rayons blancs*" (Bulletin des Sciences Nat. p. 297), but which consists in reality of a number of fleshy radiations, muscular, not nervous, and capable of being greatly elongated, the larva grasps its mandibles, and wipes them and every part of its body to which any slime adheres, using its organ in the manner of a sponge or tail to wipe away the offensive matter. When the

slime has become adherent to the body and is partially dried, the creature seems to have the power of detaching it, by curling the posterior part of the body round in every direction, and using the apparatus in the manner of a hand or claw for that purpose.

The Luminosity of the Larva.

The luminosity exists at the very moment that the embryo is escaping from the egg-shell and amnion. At that time a faint light is given out from the ventral surface of the anal segment of the being that is starting into active existence. I have repeatedly seen light emitted from those parts on each side of the twelfth segment, when the little creature has but the minute before been liberated, and is still a feeble creeping body of a pale straw colour, and not one line in length. Macaire also mentions the fact (*Journal de Physique*, July 1821, tom. xciii.) of having seen the light in larvæ that had just quitted the egg, and were of the size mentioned above. I have found the light given out most vividly when the little body has been suddenly disturbed or slightly compressed.

I have noticed the light at this early period in all my specimens reared in the closed glass tube, as well as in those produced from eggs still attached to a tuft of grass-roots in the soil. Even at this early period I have found that the little insect may be induced to give out its light more brightly than usual, when it is placed in a tin box, and agitated slightly by shaking this in a dark room. The light then emitted resembles two very minute brilliant points, the brightness of which is constantly varying and twinkling, like stars of the smallest magnitude in the heavens.

It is thus evident that the same influence that occasions the perfect glowworm to shine with increased brightness, operates equally in the very young larva. And as the light is given out by the larva from its birth, there is reason to think that the luminosity of the egg, at the later period of development of the embryo, is not due to any luminous property of the yelk-tissue, but to the special light-giving organs of the embryo.

But although light has been observed at this early period of the larva only by Macaire and myself, it has been long known that the larva, at a later period of growth, emits light. This was noticed by Swammerdam (*Bibl. Nat.* p. 124), and afterwards by Degeer (*Mém. de l'Acad. des Scien. Paris*, tom. ii. p. 261), and since by Schmidt, Macaire and Todd; and Burmeister has shown that the larva of *L. splendidula* is also luminous.

I have found the light of the larva of *Lampyrus noctiluca* to proceed from two little lobes on the ventral surface of the twelfth segment, which are the only parts that transmit light in this larva. The light, when the larva is nearly full-grown and full-fed, in good health, and placed in a warm atmosphere, is at times almost as brilliant for a few seconds as that emitted by the perfect insect. But it is of short duration, and its degree of intensity is not sustained; besides which, it is of a greener colour, and is given out only when the insect is in motion: even then the light is emitted only in flashes or scintillations. This fact, however, is of some interest with reference to the nature of the light itself, its emission being hardly referable to a phosphorescent property of secreted fluid, but more probably to discharges of vital force through nervous function.

In support of this view, it may be said, that when the young larvæ are violently shaken and driven against the sides of a box, they emit their light more brilliantly; and that the full-grown larva, under such circumstances, gives out its light for a short time almost as brilliantly as the perfect insect. The larva seems, like the perfect insect, to have some control over its light, or at all events to become excited to emit it under certain circumstances. Thus, I have noticed that when the larvæ had been exposed for a short time to artificial light, they did not shine, or but very feebly; but when the light was suddenly removed, they at first gave out not a single gleam of light, though in four or five minutes afterwards one or two began to shine; and when they had remained undisturbed in darkness from a quarter to half an hour, most of them were shining.

I have found that the larvæ shine during the whole night when undisturbed. I placed a collection of larvæ which had fed voraciously during the day, in a glass phial, which was placed on a table by my bedside on a dark night; and being awake during the greater part of the night, I observed them shining at twelve, at one, at two, at three, at four, and even so late as at five o'clock, but always far less brightly than the imago. The creature thus appears to have some control over the emission of its light in a state of rest, for I have seen them shining when undisturbed during the whole of the night. On the other hand, when they have been exposed to light, either artificial or that of the sun, it was found, when the illuminating influence was suddenly removed, that they had ceased to shine; but after remaining in darkness for a few minutes, they gave out their light again, and continued to do

so steadily until disturbed or again exposed to light, when they ceased to shine, becoming luminous again after a short interval, when the light was again removed.

Another circumstance also which influences their shining is deficiency of food. It is only when well-fed that they give out light more brightly; for if deprived of food, the light is then very feeble.

All these circumstances tend to show that the light is greatly influenced by physical causes, and that those physical causes which operate generally on the body, or health, or vital force of the animal itself, as food, motion, heat, are precisely those which affect the production of light.

The Growth and Hybernation of the Larva.

It constantly happens with insects as with other animals, that when many individuals, constituting one brood, are hatched at very nearly or exactly the same time, some of them grow more rapidly and arrive at their completion much earlier than others. This is precisely the case with the larvæ of the glowworm. Owing to this circumstance, some individuals undergo their changes more rapidly, and attain to their imago state sooner than others, but having reached that stage and performed the great intent of their being, their life is rarely if ever prolonged beyond that of their fellows in a similar state of existence.

This difference in the rapidity of the growth appears to depend on physical causes, as for instance the more complete development of the constituents, and the subsequent more complete impregnation of the ova from which these precocious growths are produced; the greater amount of nourishment which the young have taken during corresponding periods of time; and generally the circumstances in which the whole brood have been placed in regard to light, heat, air, locality, and quality of food. I have usually observed that the larger beings came first from the egg, and appeared more robust and healthy than those subsequently produced; further, that a difference of but a very few hours in the earlier hatching of these individuals is followed by a much greater difference than can be accounted for merely by the length of time between the birth and the first and subsequent changes which the several individuals undergo.

Another circumstance of very great importance, since it is applicable to all beings, is, that the facts first noticed being taken

into consideration, those become the most healthy and most matured individuals to which food in full abundance is supplied during the earlier periods of existence. Improper food, or food in too restricted quantity at this period, more affects the rapidity and extent of growth during the subsequent periods of the life of this insect, and probably also of other animals, than deficiency of proper nourishment at any farther advanced stage. Not only are the changes of the animal retarded by this deficiency, but its full development is rarely if ever attained. I may mention, in support of this statement, that there was a difference in the period at which the eggs of the glowworm, placed in the glass tube as I have mentioned, were deposited, of only *ninety-one hours*, namely from three P.M. June 22nd to ten A.M. June 26th; but there was a difference in the hatching of the larvæ from these very eggs of nearly *eight days*, or more than *one hundred and ninety hours*, namely from the morning of August 7th to that of the 15th of the same month, although during the whole period of six weeks' incubation, all the circumstances under which the whole of these eggs were placed were exactly the same. I have constantly noticed like circumstances in the development of other insects, the *Forficulæ*, *Meloë*, and others, and regard the facts stated as of general application in development.

These facts may help to explain what otherwise might seem to be the result of imperfect observation, viz. that the larvæ of the same brood of glowworms do not all undergo their changes at the same time, or even attain their maturity in the same year, although developed from the egg in the same season. For instance, the most advanced individuals of those reared in the tube, underwent their *first change* on the *nineteenth day*, and the second also in the same length of time, *nineteen days*; but others had not then entered on their *first*. This was on the 15th of September. Some individuals of other broods obtained from their native haunts, I found had undergone this change as early as the 1st of that month.

The very earliest periods of development of the glowworm are thus of considerable length, and exceed that of the majority of insects. The Sphinx larva undergoes its first two changes, if at the same season of the year and at nearly the same temperature of the atmosphere, within *thirteen days*, those of the glowworm being *thirty-eight* (Phil. Trans. 1837, p. 315). But in proportion as the temperature of the season diminishes, so is the length of time which the larva continues before changing increased, the amount of food supplied, heat, and other circumstances being the same. But inde-

pendently of any diminution of temperature or supply of food to the larva, the interval of time between each successive change is progressively increased; and this occurs in the larvæ of all insects, and perhaps the young of all animals. So that at last a very long period may elapse between the young glowworm's penultimate change of skin, and that by which its larva or simple period of growth is terminated, by its assuming the quiescent state of a nymph; and if any yet earlier changes are retarded, either through late development from the ovum or insufficient supply of food, or through the influence of external physical causes, its growth is arrested, and the animal does not complete its development as a larva until the following summer. Thus the changes of the being are influenced by *physical causes*, and subject to *physical laws*.

It is only by reference to these circumstances that we are enabled to understand how the glowworm occasionally passes more than an entire year without undergoing its metamorphosis to the perfect state, seeing that this its latter stage is always attained in the month of June and July in this country. Yet the concurrent observations of naturalists have shown that this is the case. Rogerson noticed that it may be a year and nine months before it becomes a perfect larva; and I have certainly found this to be the case in some under my own observation. As my specimens were numerous, I was enabled to observe their habits during the winter and their change to the perfect state; but as I had by accident lost most of the brood I had reared, and watched to their second change, my observations were made on others supplied to me at the end of September from their natural haunts. I preserved them in an earthen vessel partly filled with mould and a turf of grass, and secured at the top with gauze. An abundance of *Helices* were supplied to them, and some of the larvæ seemed almost never to desist from feeding. I put with these the only four remaining specimens of the brood I had reared. The whole continued to gorge to repletion during the first part of October, and gave out light freely when touched, or in any way compressed. The temperature of the room in which they were kept was at this time ranging from 50° to 55° Fahr.

In the evening of the 18th of October, when the temperature of the room was 50° Fahr., the larvæ were still active and feeding; they were very healthy, and some of them were shining—one very brightly.

On the 25th of November I found them still feeding, but the largest were less active in their movements; they seemed to be in

quest of moisture, and most of the food was consumed. On adding water to the soil, they began immediately to sip the fluid. Others were at rest in a state of partial torpor in the emptied shells of some of the snails which they had devoured. They seem to use these shells as their hybernacula, taking food at intervals and then relapsing into a state of repose. One or two, however, were partly buried in the earth. The temperature of the room in which they were kept at this time usually ranged from 40° to 50° Fahr. On one occasion at the end of August and beginning of September, I found the larvæ pass under the turf among the roots of grass, and desist from feeding: this occurred with specimens which but a few days before attacked the snails most pertinaciously and voraciously. The temperature of the season was then from 65° to 70° Fahr.

On the 30th of November, the temperature of the room having been a little increased during the last few days, the larvæ were again feeding as eagerly as before, and several of them now appeared to be very fat. Still however they sought food, but moved more slowly than heretofore.

On the 13th of December, the temperature of the room being then 51° Fahr., the larvæ were still in a state of hybernation: when touched they moved their bodies slightly, but did not attempt to escape. Even in this state however they still gave out light, the brightness of which was increased at the moment they were touched.

On the 22nd of December, the temperature of the room during the preceding night having been stationary at 35° Fahr., and at the time of the observation only 36° Fahr., they were still hybernating, and lay with the body contracted and the head partially drawn beneath the thorax: when touched lightly, they still moved the body. Some of them were reposing in the empty snail-shells. I had now an opportunity of observing that, in a dry atmosphere, even at this low temperature, they still continued to give out light; for when they were touched and turned on their backs, they not only gave out light, but that with greater brightness. A low temperature of the atmosphere therefore does not necessarily arrest their luminosity; and this fact seems to favour the view that the light is the result of a vital property, of the nature perhaps of the electric discharge of fishes, rather than of phosphorescence or chemical action.

On the 25th of December, when the temperature was 48° Fahr., they still remained hybernating.

On the 30th of December, on taking them into an atmosphere

of 60° Fahr. for a short time, they became aroused, gave out light, and moved about apparently in search of food.

On the 6th of January, when the temperature of the room had remained for a day or two at only 33° Fahr., that of the external atmosphere being then 28° Fahr., my larvæ were again in a state of hybernation, and when disturbed still gave out a faint light, but when undisturbed no light was perceptible: this I think still further confirms the view I have advanced, as at this low temperature the respiration of the insect was almost completely suspended. The part from which the light was given out was the two spots on the penultimate or twelfth segment.

On the 2nd of February, at a temperature of 45° Fahr., I found the specimens aroused, and apparently disposed to feed: some food was supplied to them, and they commenced feeding, but less eagerly than in the autumn.

From this time, during the months of March and April, they were supplied with food: many of them died; several, however, still remained to undergo their changes to the perfect state.

On the 28th of May, the temperature being 70° Fahr., my specimens were still feeding, and continued to do so until the 9th of June, a few days before which they ceased to take nourishment and became more inactive.

Change of Tegument of the Larva.

I have not been able to ascertain with precision the number of times the larva changes its tegument before arriving at its full size. I believe, however, there are four changes. The mode in which this is performed differs from that of many other larvæ, as it has been correctly described by some observers.

I have several times witnessed the operation. It is effected by a lateral fissure on each side of the prothorax and mesothorax, extending forwards to the neck behind the head, so that the whole may be elevated like the lid of a box, out of which the larva first presses its thoracic segments, and then withdraws its head and the organs of sense, and the legs, slipping backwards the skin to the extremity of its body.

At the time of the larva leaving the skin it is perfectly white and colourless, delicate and easily injured, and when disturbed or touched gives out its light more vividly. Immediately the tegument has been cast, the larva coils itself up in a circle, and seems forcibly to extend all the segments of its body, protruding

its head and neck to their fullest extent, as well as its anal appendage. Although the creature is so courageous at other times, it is now very timid and takes no food for several hours: indeed it will not venture near a snail to attack it, as if conscious of its present weakness.

One specimen which changed at ten o'clock in the evening became shining and active, and acquired its dark colour at the expiration of twelve hours; but it did not venture to take food for several hours afterwards.

The Nymph.

On the morning of the 9th of June one of the larvæ cast its skin, and assumed the condition of a nymph. This specimen was a female; but a male specimen had already changed to the same state only a few hours before. At mid-day, when the temperature was 75.5° Fahr., a second female assumed the same condition; and on the evening of that day at six P.M., when the temperature was 77.5° Fahr., two others, one male and one female, also changed. At ten P.M., the heat being still so high as 72° Fahr., I found the whole of these giving out an abundance of light; the females, although undisturbed, were exceedingly luminous, and the males shone almost as brightly as the perfect insect in its state of greatest activity.

It was quite evident that in the quiescent state of a nymph, the emission of the light was not the result of any direct influence of the will or instinct of the insect; it was simply the result of the *vital forces* of the body, the manifestation of which seemed to be greatly augmented by the very high degree of temperature of the atmosphere. It was interesting also to notice that the whole of the specimens, three females and two males, underwent their change on the same day, in which the weather became much warmer than for some days previously. The light emitted by these insects was apparently in a ratio corresponding to the increase of heat; the rapid increase of the temperature operated nearly equally upon the whole in inducing their transformation to the nymph state, within a few hours of each other; and, as we shall afterwards learn, the same external force equally accelerated their development when they had assumed this condition.

The mode in which the change to the nymph state is effected is precisely that of the shifting of the skin by the larva; but the result of the change is different, in consequence of the operation of

laws of organization, which I shall attempt to explain in connexion with the anatomy of the insect.

The form which the insect assumes as a nymph is that of a semicircular body.

The Imago.

On the 16th of June, the temperature of the atmosphere being then 73° Fahr., and it having been likewise at nearly the same height during some preceding days, the three female specimens threw off their nymph covering and assumed the *Imago* state: their change was thus completed at this high temperature in *seven days*,—a very marked instance of the influence of increased heat in accelerating the metamorphosis. M. Maille found that his insects passed *fifteen days* as the interval between the larval and perfect state, namely seven days of quietude in assuming the form of nymph, and *eight* full days in the nymph state (Bull. des Sc. Nat. viii. 297). But some specimens which I reared from the larvæ in the summer preceding this, left the larva state about the 25th of May, and at a much lower temperature of the atmosphere than those now observed.

The pupa-covering is exceedingly thin and delicate; and not only during the pupa state, but immediately when they became perfect insects, my specimens shone very brightly. The tegument thrown off by the larva on becoming a pupa is solid and of a dark colour, but that of the pupa, shed on assuming the imago state, is almost colourless, and very thin and transparent.

The two male specimens, which assumed the nymph state at the same time as the females, did not reach the imago condition until the night of the 20th of June, and were thus *eleven days* in the state of nymphs, so that the females appear to become perfect much earlier than the males. This fact is of importance with regard both to the natural history and the relative anatomical development of the two sexes. The female undergoes but little change in her anatomy, and continues in a semilarval condition; consequently she is most early fitted for leaving the puparium, and is ready to receive the male, whose life is very limited.

From the individuals thus produced, I may simply state that I succeeded in again observing the deposition of eggs and the hatching of larvæ.

We are now prepared, by the consideration of the natural history, to proceed to the description of the anatomy of the glowworm, which will form the subject of a future paper.

On the Quantity of Tannin in the Galls of *Cynips Quercus-petioli*.
By EDWARD HART VINEN, Esq., M.D., F.L.S. &c.

[Read February 19th, 1856.]

MUCH interest has been excited by the frequent occurrence in this country of the galls of *Cynips Quercus-petioli*, and they appear, from a recent communication in the 'Gardeners' Chronicle,' to have increased to such an extent during the past season, as to do vast mischief to the trees infested by them, rendering them unproductive of acorns, and even threatening their entire destruction.

In a recent conversation with Mr. Westwood on this subject, he informed me that these galls had been used in Devonshire for the purpose of making ink, and at the same time suggested that it would be desirable to know whether they contained sufficient tannin to render them useful substitutes for the ordinary galls of commerce. At his request I undertook to ascertain this, and thought the result might be sufficiently interesting to communicate to the Society: the following is the result of my examination. By macerating 100 grains of Devonshire galls in æther and water, a residue was obtained weighing 26·74 grains: this contained 17 grains, or about two-thirds, of tannic and gallic acids. In order to estimate the comparative value of these galls with those of commerce, 100 grains of best Aleppo galls were submitted to the same treatment with æther and water. The residue weighed 58·50 grains, containing 56 grains of tannic and gallic acids. Of the superiority of the foreign galls there can of course be no doubt; but in comparing the results of these two analyses, it is necessary to observe, that the Aleppo galls operated on were very heavy specimens of the best kind of galls of commerce, and that they had not been perforated by the *Cynips*, while the Devonshire galls had all been perforated, and therefore contained a much smaller proportion of tannin than would have been the case if they had been examined at an earlier period.

If we compare the published analyses of nutgalls, considerable difference will be found in the quantity of tannin obtained by different chemists. The following are the principal:—

Sir Humphry Davy found ..	26 per cent. of "tannin."
Pelouze	40
Leconnel	60
Guibourt	65
Mohr	72
Buchner	77

However widely these results may vary, they are entitled to every credit; and high as are those of the two last-mentioned chemists, their well-known accuracy will ensure entire confidence in their statements. I am inclined to think that these great discrepancies are owing to accidental causes, among which the variable nature of the seasons, which influences so much the quantity and intensity of all vegetable secretions, may be a principal one. With the small amount of tannin found in the Devonshire galls I must confess myself much disappointed; but I hope in the ensuing summer to procure some of them at an earlier period, and before they have been perforated by the *Cynips*. I have no doubt that they would then be found to contain enough tannin to justify their being collected for commercial purposes; and if they were gathered at the proper season, before the *Cynips* has escaped, and when the gall is in its most vigorous and valuable state, another good result would follow. The insect would be prevented from increasing to what seems to be a mischievous extent, and a check would be put to the serious injury, if not entire destruction, with which the oak plantations in some of our southern counties appear to be threatened.

Note on *Lepidosiren annectens*, Owen. By EDWARD NEWMAN, Esq., F.L.S.

[Read January 15th, 1856.]

[Abstract.]

REFERRING to Prof. Owen's paper on *Lepidosiren* in the 18th volume of the Society's "Transactions," the author states that the conclusion at which that gentleman has arrived, that the animal in question is a Fish, although controverted by some of our best naturalists, appears to him to receive confirmation from one or two points in its structure on which no great stress has hitherto been laid. The first of these relates to the mode in which the gill is covered, having only a single small external opening, in which respect *Lepidosiren* makes a very near approach to *Muraena*. Secondly, the two peculiar anterior teeth in the upper jaw so closely resemble those of some Fishes, that the vignette representing these teeth in *Echiodon Drummondii*, given in Mr. Yarrell's "History of British Fishes," might serve as well for the front teeth of *Lepidosiren*. Thirdly, the continuous dorsal, caudal and anal fin, and the absence of pectorals and ventrals, are common

characters among *Muraenidae*. And fourthly, the true Fish-scales, together with the lateral line extending from the gill to the extremity of the tail, are characters peculiar to Fishes, and not to be found among Amphibian Reptiles. Assuming then that *Lepidosiren* is unquestionably a Fish, and not either a Reptile or an osculant between Fishes and Reptiles, Mr. Newman regards it as completely obliterating the boundary set up by Cuvier between the two great subclasses of Fishes, the Osseous and the Cartilaginous. In support of this opinion he quotes several passages from Prof. Owen's paper, and concludes by stating his conviction that it is "equally impossible to place it in either the Cartilaginous or Osseous series; and we are compelled either to establish an intermediate series, consisting of but three species or perhaps genera, or to break up those great divisions, which have received the almost universal approbation of naturalists. The first course seems most undesirable in an age in which we are exerting ourselves to find associates and allies for every abnormal form, however apparently isolated. The alternative, the mingling of cartilaginous and osseous fishes, seems inevitable."

Description of a New Species of *Paussus* from Central Western Africa. By J. O. WESTWOOD, Esq., F.L.S. &c.

[Read February 19th, 1856.]

DURING the twenty-six years which have elapsed since the publication of my first Monograph on the family *Pausside* in the 16th volume of the "Transactions of the Linnean Society," our knowledge of the species of this singular group has increased in a remarkable manner, as we are now acquainted with nearly a hundred well-defined species. Indeed, even since the appearance of the synopsis of the family which I published in the 19th volume of the "Transactions" in 1841, the number (which then amounted to 47) has been doubled. A considerable number of these new species were described and figured in the 2nd volume of my "Arcana Entomologica" (1845), together with coloured figures of all the previously described species. Seventeen new species were described by me in the "Proceedings" of the Linnean Society, June 19, 1849. A new species from Tangier (subsequently found also in Spain) was described by M. Léon Fairmaire in the "Annales" of the French Entomological Society for 1852. Six additional species with a fresh general synopsis (recording eighty-five species)

were published by me in the "Transactions of the Entomological Society" (vol. ii. p. 84), read August 2nd, 1852, and four additional species were added by me in the "Transactions" of the same Society (vol. iii.), read July 3rd, 1854. I have now the pleasure of adding another new species of the genus *Paussus*, very remarkable in several of its structural details, and which belongs to the African section of the genus with a bipartite prothorax and an excavated clava to the antennæ.

PAUSSUS MURRAI, Westw.

P. prothorace bipartito clavâque antennarum posticè excavatâ; piceo-rufus, sub lente creberrimè punctatus, capite inter oculos transversè elevato et in medio fossulis duabus minimis transversis impresso, angulis posticis partequè posticâ prothoracis extis porrectis et ferè latitudine elytrorum, podice setis longis marginato.

Long. corp. 3 lin.

Hab. "Old Calabar," Africæ tropicæ occidentalis. In mus. nostro. Amicissimè communicavit D. Andr. Murray, Entomologus Edinensis peritissimus.

This species is distinguished at once from every species hitherto described in the peculiar form of the clava of the antennæ and prothorax. The upper side of the head is sloping and slightly concave from between the eyes to the fore margin, which is slightly emarginate and a little depressed. Between the eyes the head is raised into a transverse ridge, in the middle of which are two very minute impressions placed transversely with raised black edges: the hinder margin of the eyes is furnished with some porrected bristles: the antennæ have a thick and somewhat prismatical basal joint, and the clava is large, being about equal in size to the prothorax; it is navicular, the front margin or keel being acute, with three deep transverse impressions within the margin. The inner basal edge is very deeply incised close to the insertion of the clava upon the basal joint, the remainder of this margin forming a long and acute angle, the outer edge of which extends to the base of the deep boat-like excavation; the upper edge of this excavation is very slightly crenated; the lower edge on the contrary is more irregular, being deeply emarginate at its base, the emargination clothed with strong bristles, and oblique from the middle to the apex of the antennæ, which is rounded; within the posterior margin the excavation is marked with four deep transverse impressions; the hind part of the head is narrowed into a neck. The prothorax is strongly bipartite; the anterior portion is the shorter, having a sharp ridge running across it, with

each side produced into a strong and acute angle. In the centre of the pronotum is a deep excavation, with a tuft of luteous setæ on each side: the hinder portion has its sides gradually dilated outwards, forming a strong salient tooth or spine on each side, pointing to the outer angle of the shoulder of the elytra; the space between the point of this spine and the outer posterior angles of the prothorax being emarginate, and furnished with a strong tuft of luteous setæ. The elytra are oblong, and with the sides nearly parallel. The disk, and especially the lateral margins, clothed with luteous setæ. The podex is oblique, flat, with the outer margin slightly raised, and fringed with long strong reddish curved bristles. The legs are slender; the tibiæ compressed, but not dilated; the tarsi distinctly 5-jointed, the basal joint being as large as the following.

The species is named in honour of Andrew Murray, Esq., of Edinburgh, whose knowledge of *Coleoptera* is evinced by the excellent Catalogue of the Scottish species recently published by him, as well as by his entomological contribution to the fine volume on the "Natural History of Dee Side" by the late Dr. MacGillivray, recently published by command of Her Majesty, and so liberally distributed by the Prince Consort. Two specimens of the species before us were received by Mr. Murray from Old Calabar, and it is to his liberality that I am indebted for one of them.

On the Influence of the Sexual Organ in Modifying External Character. By WILLIAM YARRELL, Esq., V.P.L.S. &c.

[Read March 18th, 1856.]

HAVING been requested to supply some notes to the Appendix on the subject of Red Deer, published in the handsome volume of the "Natural History of Dee Side and Balmoral," of which I have had the honour to receive a presentation-copy from H.R.H. Prince Albert, I regret that my opportunities of observation on the Red Deer have been so limited; but as the same physiological laws appear to prevail in the three species of Deer which belong to this country, I beg to offer a few remarks on the influence of the sexual organ in modifying external character; the horns in Deer furnishing the most obvious external secondary sexual character in this tribe of animals.

In the volume referred to, it is stated at page 462: "That the production of the horns is dependent upon conditions connected with the sexual function, is proved by the fact, that they are not produced in castrated stags." At page 470 Mr. Robertson states that, "If the operation is imperfectly performed at the time that the stag is void of horns, small horns will grow; but these are never cast, and the velvet which always covers them when they are growing, retains its freshness to the last." Mr. Robertson has the reputation of being good authority, and I have reason to believe that he is correct. When a stag carrying horns is castrated, the operation being perfectly performed, the horns are cast, sometimes as early as the fifth day, and generally within three or four weeks. Very soon after that, the young horns begin to bud and show, whether the stag at the time of castration carried horns or not. The horns increase in size, but are frequently irregular in form, unequal on the two sides, and deficient in bulk and character for the age of the animal. Males in this state are usually called Heavers, or Heaviers, a term apparently intended to have reference to the greater size and weight of body such stags attain; but Pennant in his "British Zoology," under the article on the Goat, says, "that the meat of a castrated goat of six or seven years (which is called Hyfr) is reckoned the best; being generally very sweet and fat. This makes an excellent pasty, goes under the name of rock venison, and is little inferior to that of the deer." The Anglo-Saxon word for a he-goat is Hæfer.

The author of the "Sportsman's Cabinet," published in 1804, states in volume ii. page 61, "that Heaviers are experimentally proved to be of great strength, and afford good sport before hounds, for which reason the Royal hunting establishment of His Majesty George III. was never without a regular succession. The perfect males, after their rutting season, are out of condition for hunting.

"Among the Laplanders the males only of their rein-deer are used as beasts of burden and draught, and chiefly those which are castrated, as they are the strongest."—G. P. Blom's Essay.

To return to the castrated red deer: I remember to have seen a large red stag which had been hunted and caught in one of the outbuildings of a farmer's stack-yard in Berkshire. The horns were unequal in size, both being straight portions of the beam only; one about six inches long, the other about double that length, and both in their velvet. On the beam of greater length

was a rounded bulbous excrescence, upon which blood appeared at the slightest injury.

At the Zoological Gardens some years since, a female rein-deer died while her horns were growing and in the velvet. When the skin had been taken off, I went up to look at the state of the carcase. The shoulders and the whole of the neck were of a bright scarlet colour, from the strong determination of arterial blood to the head at that particular period.

Inequalities in the size and form of the two horns of the same deer may be accounted for, as an injury from a gun-shot wound, or other cause, may affect the horn on one side only by interfering with the natural size or course of the arteries.

When the horns of deer have completed their growth, the blood-vessels are compressed at the burr, and the velvet-like covering then begins to dry up, crack, and peel off; the deer by his fraying assisting to get rid of it.

Colonel Charles Hamilton Smith, in the article on Mammalia in Griffith's "Animal Kingdom," vol. iv. p. 93, says, "Hinds are asserted to have been found with horns, but no well-authenticated fact places this beyond a doubt."

In the Appendix to the "Dee Side Natural History," on the red deer of Scotland, p. 472, it is stated, that in no one instance does it appear that the hind of the red deer was ever observed to have horns. To this, however, there are exceptions, apparently the operation of a physiological law. John Hunter, in his "Observations on Animal Economy," states, that where the male and female among animals are distinguished by a difference in their external characters, by depriving either sex of the influence of the true sexual organ, they will seem to approach each other in outward appearance.

Some years since, a red hind, in the forest of the Duke of Gordon in Scotland, was observed to carry a single horn on one side of her head,—such a horn as the red male bears in his third year. As this appearance was unusual and interesting, a request was made to be allowed to shoot her. Leave was immediately granted, the hind was shot, and on internal examination by two competent persons, she was found to have a scirrhus ovary on the opposite side to that on which she bore the horn. The skull and horn as attached are preserved in the armoury at Gordon Castle, with a label appended detailing the particulars.

About four years ago, a red hind, in the park at Holkham, was observed to carry one horn of some length. She was closely

watched, and having cast this horn at the usual period, it was secured and preserved. I have seen it very recently. It is straight and upright, measuring thirteen inches from the burr to the end; about as thick as a man's fore-finger at its base above the burr, but tapers gradually; brown in colour at the bottom, whiter above, hard, smooth and polished towards the point, which is sharp. To add to the interest in this case, this hind dropped a calf; we may therefore suppose, the cornua and ovaries being double, that one side was healthy and perfect, the other side probably diseased.

About six years since, a red hind in the forest of the Lords of Lovatt was observed to bear a horn, and of this instance I hope to receive further particulars.

The writer in the "Sportsman's Cabinet" before referred to, mentions, at p. 61, that a deer "being deprived of only one testicle, the horn will never regenerate on that side; but continue to grow and be annually shed on the other, where the remaining testicle has not been taken away." This statement of a lateral influence, and the case of the Gordon Forest hind, induced an experiment which I will endeavour to describe. In the autumn of the year 1833, having the advantage of being on the Council of the Zoological Society with Prof. Owen, I suggested to him an experiment having reference to this sexual lateral influence. Mr. Owen very kindly immediately joined me in it. We procured two fallow-bucks, equal in size, and both in their fourth year one, a dark-coloured buck of the breed considered to have been brought originally from the North; the other a buff-coloured one from the South, and both carrying horns of equal size, and of the fourth year.

From one of these fallow-bucks, while held on the ground, Mr. Owen removed the testis of the right side, and from the other buck, the testis on the left side. Neither of these bucks cast either horn, nor was any lateral influence observable. They shed their horns as usual in the following spring, the new horns coming in due course; but in the autumn, when these horns had ceased to grow and become hard, all four horns were those of the third year, and not those of the fifth year: no lateral influence was observable, but it was plainly shown that the diminished sexual power, consequent upon the operation, had produced a corresponding diminution in the size of the horns in both cases. Towards the end of 1834, the Society's farm at Kingston, where the bucks had been kept, was given up, and further observation prevented.

The fallow-buck is at his best in his sixth, or at most in his seventh year; after which, though the carcase may increase, the horns become smaller, and irregularly going back annually through something like their former stages of increase, a very old buck has from the state of his horns been mistaken for a young one. In the osteological department of the Museum at Paris, there was, and may be now, the skeleton of a female rein-deer in which the horns were reduced to little more than a rudiment of the beam and the brow-antler; yet was this animal so old, that the molar teeth were worn down to the edges of the alveolar cavities.

Park-keepers in large establishments, where much venison is required, are in the habit of cutting 20, 30 or 40 bucks in the spring, and giving them the summer run of the park, or better still, in paddocks, while the grass remains nutritious, after which they are taken up for stall-feeding and fattened as wanted. These bucks never lose their velvet. Some park-keepers practise modifications when cutting, producing corresponding differences and effects. If a fawn is castrated at a very early age, and the earlier the better, he will never put forth horns of any sort, but remain a polled buck during life.

The roe is the smallest of our British deer, and being under the influence of the same physiological laws, requires but a brief notice.

The horns acquire but three points each at their best, and as the roe-buck increases in years, his horns, like those of our other deer, diminish in size and number of points, till they recede irregularly to their early appearance in the third or second year.

Roe-deer are preserved in some parks in England, as at Petworth in Sussex, and elsewhere, and form a pleasing addition to the scene. After having fed in the early morning, they, in fine weather, scrape out a bed for themselves in long grass, and when approached jump up in haste, and send away like a hare from her form.

The males are said to be less friendly disposed towards their young than the males of either of the other two species; but with the very common tendency, not confined to deer, to use power where it is possessed, I suspect this tendency has its origin in the state of the horns.

Roe-bucks shed their horns in December: the new horns, while growing, are covered with their velvet, but become hard and burnished by the end of April. The kids are dropped in May, and may be occasionally exposed to a push of the then hard and pointed horn.

The horns of the red and fallow deer remain in their velvet till August, and while they are in that soft and tender state, the males never make an offensive use of them; and long before they are hard and burnished, the calves of the one, and the fawns of the other, dropped about the first week in June, are strong and nimble enough to get out of harm's way. This, however, is certain, that the old females of all the three species take especial care to conceal their young while they remain helpless.

The neutral effect produced when the animal happens to be deprived of the influence of the true sexual organ, whether from original malformation, subsequent disease, or artificial obliteration, is particularly conspicuous in our common fowls. The capon ceases to crow; the comb and gills do not attain the size of those parts in the perfect male; the spurs appear, but remain short and blunt; and the hackle feathers of the neck and saddle, instead of being long and narrow, are short and broadly webbed. The capon will take to a clutch of chickens, attend them in their search for food, and brood them under his wings when they are tired.

In the imperfect female the comb increases; a short spur or spurs appear; the plumage undergoes an alteration, getting what is usually called "foul-feathered;" she ceases to produce any eggs, and makes an imperfect attempt to imitate the crow of the cock. Being profitless in this state, she is usually made away with. The proverb says,

"A whistling woman and a crowing hen
Are neither good for gods nor men."

Our neighbours and allies the French, who seem to take a wider range in their prejudice against habits which they consider irregular, have the following proverb, which says,

"Poule qui chante, Prêtre qui danse,
Et Femme qui parle latin,
N'arrivent jamais à belle fin."

I have seen two instances in which females of the wild duck have assumed to a considerable extent the appearance of the plumage of the Mallard, even to the curled feathers of the tail. One of these birds, in my own collection, was given me when alive by my kind friend the late John Morgan, Esq. When this bird was examined after death, the sexual organs were found to be diseased, as in the cases of the hen pheasants referred to, and figured in the 2nd volume of the "History of our British Birds." In the published illustrations to his "Fauna of Scandinavia,"

M. Nilsson has given a coloured figure of a duck in this state of plumage, plate 163, which is called a barren female, and in which the curled tail-feathers are made very conspicuous.

From the general similarity in these females to the appearance assumed for a time by healthy males in July, I am disposed to refer this seasonal change in males, in this and in other species of ducks, to a temporary exhausted state of the male generative organs, and their consequent diminished constitutional influence on the plumage.

A male shut up by himself from early spring to the end of July undergoes no change in his plumage; but if he is allowed to associate with females till their season of incubation commences, he then goes through the change, and this appears to indicate the cause of the partial summer moulting.

The appearance is somewhat different, but yet very interesting, in Insects and Crustacea. In these classes the sexual organs are double, and distinct, arranged one on each side of the elongated mesial line. It sometimes happens that a species in which the sexes are of a different colour, or markings, or form, has one sexual organ of each sort, male and female, in which case each half of the same insect is developed under the exclusive influence of the sexual organ on its own side. Instances are preserved among our collections of butterflies, moths, and beetles; and I have seen it twice in the common lobster.

Nor is the human race exempt from the operation of the law which prevails in the Mammalia. In women, at an advanced age, hair appears on the chin and upper lip, and the voice alters, becoming deep in its tone. The beard in old men becomes thin and soft, and our own inimitable Shakspeare has told us,

. . . "his big manly voice,
Turning again toward childish treble, pipes
And whistles in his sound."

Catalogue of the Homopterous Insects collected at Singapore and Malacca by MR. A. R. WALLACE, with Descriptions of New Species. By FRANCIS WALKER, Esq., F.L.S.

[Read May 6th, 1856.]

To carry out the object I had in view, as explained in the note to Mr. Walker's paper on the *Diptera* of Singapore and Malacca,

published in the first number of the "Journal of Proceedings," I have induced the same author to undertake the following Catalogue of Homopterous Insects from the same localities. The specimens were procured during the six months commencing with May and terminating with October, and are all in my collection.

W. WILSON SAUNDERS.

3rd May, 1856

Ord. *CICADINA*, *Burmeister*.

Fam. *STRIDULANTIA*, *Burm.*

Gen. *PLATYPLEURA*, *Amyot et Serv.*

1. *Platypleura semilucida*, *Walk. Cat. Homopt.* pt. 1. 20. 27.
Inhabits also Java.

Gen. *DUNDUBIA*, *Amyot et Serv.*

2. *Dundubia imperatoria*, *Westw. Arc. Ent.* ii. 13. pl. 51 (Cicada).
Inhabits also Borneo and Sumatra.

3. *DUNDUBIA GUTTIGERA*, n. s. Testacea, capite suprà vittis tribus angulosis, anticè annulo elliptico lineisque transversis lateralibus nigris, prothorace vittis duabus dorsalibus subparallelis nigris, mesothoracis scutello vittis quinque nigris, abdomine ferrugineo, alis vitreis; anticarum venis marginalibus apice venulisque transversis fusco-maculatis.

Testaceous. Head above with three angular black stripes, and in front with a black elliptical ringlet, which has black transverse lines on each side. Prothorax with two black dorsal nearly parallel stripes. Scutellum of the mesothorax with five black stripes, the inner pair abbreviated, the outer pair interrupted. Drums small, rounded. Abdomen ferruginous. Wings vitreous. Fore wings with a brown spot on each transverse veinlet and on the tip of each marginal vein. Length of the body 11 lines; of the wings 34 lines.

4. *DUNDUBIA ALBIGUTTA*, n. s. Viridis, ex parte testacea, capite suprà lineis duabus obliquis duabusque lateralibus transversis nigris, anticè lineis nonnullis transversis lateralibus nigris, abdomine subtùs tuberculis quatuor nigris, alis vitreis; anticis apice subfuscescentibus, guttà costali albidà, venulis transversis 1â et 2â fusco-maculatis.

Green, partly testaceous. Head with two black lines forming an angle in front of the ocelli which are bordered with black; a black line on each side of the fore-border; front with black transverse lines along most of the ridges on each side. Drums small, rounded. Abdomen with two black tubercles on each side beneath. Wings vitreous. Fore wings slightly clouded with brown at the tips; a whitish spot on the costa at the tip of the front areolet; 1st and 2nd transverse veinlets with brown spots. Length of the body 9 lines; of the wings 32 lines.

5. *DUNDUBIA INTEMERATA*, n. s. Testacea, alis vitreis, costâ fulvâ, venis viridibus.

Testaceous. Drums small, triangular. Wings vitreous; costa tawny; veins green; 2nd marginal areolet a little shorter than the 1st; 1st transverse veinlet oblique, hardly eurved, parted from the 2nd by full thrice its length; 2nd straight, more oblique and much shorter than the 1st; 3rd nearly straight, longer than the 1st; 4th a little shorter than the 3rd and as long as the 5th, from which it is parted by about thrice its length. Length of the body 10 lines; of the wings 34 lines.

Gen. *CICADA*, *Linn.*

6. *CICADA VIRGUNCULA*, n. s. Viridis, capite parvo, abdominis basi suprâ et segmentorum marginibus posticis luteis, alis vitreis, costâ venisque viridibus.

Green. Head small. Drums very small. Abdomen luteous above at the base; hind borders of the segments luteous. Wings vitreous; costa and veins green; 2nd marginal areolet much shorter than the 1st; 1st transverse veinlet straight, very oblique, parted from the 2nd by about thrice its length; 2nd upright, nearly straight, much shorter than the 1st; 3rd almost straight, as long as the 1st; 4th longer than the 3rd and as long as the 5th, from which it is parted by much less than its length. Length of the body $6\frac{1}{2}$ lines; of the wings 17 lines.

Gen. *HUECHYS*, *Amyot et Serv.*

7. *Huechys sanguinea*, *Deg. Ins.* iii. 221. 18. pl. 33. f. 17 (*Cicada*).
Malacca. Inhabits also Java and China.

Fam. *FULGORINA*, *Burm.*

Subfam. *FULGORELLE*, *Spinola.*

Trib. *FULGORITES*, *Spinola.*

Subtrib. *FULGOROIDES*, *Spinola.*

Gen. *HOTINUS*, *Amyot et Serv.*

8. *Hotinus subocellatus*, *Guérin*; *Delessert, Souvenirs Voy. Inde*, 66. pl. 16. f. 1; *Rev. Zool.* 1839 (*Fulgora*).

Malacca. Inhabits also Nepaul.

Subtrib. *LYSTROIDES*, *Spinola.*

Gen. *APHÆNA*, *Guérin.*

9. *Aphæna rosea*, *Guérin, Voy. Belanger, Zool.* 454. pl. 3. f. 3.

Malacca. Inhabits also Sumatra.

10. *Aphæna Saundersii*, *White, Ann. Nat. Hist.* 1846, xvii. 330.

Malacca. Inhabits also Hindostan and Borneo.

Subtrib. *DICTYOPHOROIDES*, *Spinola.*

Gen. *DICTYOPHORA*, *German.*

11. *Dictyophora speilinea*, n. s. Viridis, capite lanceolato prasino carinis tribus suprâ unâque subtus luteis, prothorace carinis tribus prasinis dua-

busque luteis, mesothorace carinis tribus lateribusque ex parte prasinis, tibiis anticis tarsisque anterioribus fulvis, alis limpidis, venis stigmatæque viridibus.

Green. Head emerald-green, with three luteous ridges above and one beneath; protuberance lanceolate, ascending, as long as the hind part of the head. Prothorax with three emerald-green ridges, the lateral pair marginal and accompanied by two luteous ridges. Mesothorax with three emerald-green ridges; sides partly emerald-green. Fore tibiæ and anterior tarsi tawny. Wings limpid; veins and stigma green, the latter occupying three areolets. Length of the body 5 lines; of the wings 14 lines.

Singapore.

Gen. CROMNA, n. g.

Dictyophora affinis. *Caput* suprà conicum, subascendens; frons lanceolata, subearinata, marginibus vix elevatis. *Antennæ* breves; articulus 1^{us} 2^o multò brevior. *Thorax* subearinatus. *Prothorax* subarcuatus. *Pedes* breves. *Alæ* latæ; anticæ areolis costalibus et marginalibus ordinariis areolisque plurimis minutis discalibus abnormibus, costâ subconvexâ, margine exteriore subquadrato, angulo interiore peracuto.

Allied to *Dictyophora*. Head conical above, very slightly ascending; front lanceolate, indistinctly keeled, with the margins hardly elevated. Antennæ short; 2nd joint very much shorter than the 1st. Thorax with a slight keel. Prothorax somewhat arched. Legs short. Wings broad. Fore wings with regular areolets along the costa and along the exterior border, and with very numerous minute irregular areolets over the rest of the surface; costa slightly convex, forming a slightly obtuse angle at the tip; exterior border straight, subquadrate; interior angle very acute.

12. CROMNA ACUTIPENNIS, n. s. Viridis, subtùs pallidior, capite thoraceque testaceo-vittatis, alis anticis lineâ marginali fuscâ, posticis albis.

Green, paler beneath. Head and thorax with testaceous stripes. Fore wings with a brown line extending from near the tip of the costa to one-third of the length of the hind border from the interior angle. Hind wings white. Length of the body 3½ lines; of the wings 10 lines.

Malacca.

Gen. DARADAX, n. g.

Caput lanceolatum, ascendens, lateribus elevatis; frons lanceolata, carinata. *Antennæ* globosæ, minimæ. *Prothorax* valdè arcuatus, carinatus. *Mesothorax* quadricarinatus. *Alæ* anticæ fusiformes, areolis costalibus et marginalibus plurimis ordinariis, discalibus longis.

Head lanceolate, ascending, with a ridge along each side; front lanceolate, with a middle keel; sides also ridged. Antennæ globose, very minute; bristle moderately long, very slender. Prothorax much arched, with a slight middle keel; each side forming a fusiform compartment. Mesothorax with four keels. Fore wings fusiform, with numerous parallel equidistant veinlets along the costa; discal areolets long; marginal areolets short, like those of the costa.

13. *DARADAX FUSIPENNIS*, n. s. Viridis, ex parte lutescens, alis anticis fusco apud marginem anteriorem guttatis, posticis albis.

Green, partly lutescent. Fore wings with brown dots along the exterior border. Hind wings white. Length of the body 3 lines; of the wings 7 lines.

Malacca.

Gen. *ELICA*, n. g.

Caput conicum, subascendens, suprâ tricarinatum; frons lanceolata, tetragona, tricarinata, lateribus elevatis. *Antennæ* breves. *Prothorax* brevissimus. *Mesothorax* tricarinatus. *Alæ* anticæ latæ, venulis plurimis transversis costalibus, arcolis discalibus basalibus elongatis, exterioribus abbreviatis sæpius hexagonis.

Head conical, slightly ascending, with three ridges above; front lanceolate, tetragonal, with three ridges, the lateral pair curved, margins also ridged. Antennæ conical; bristle about twice the length of the preceding part. Prothorax very short. Mesothorax with three keels. Fore wings broad, with numerous transverse veinlets along the costa; discal areolets elongate towards the base of the wing; those exterior more numerous, short, and generally hexagonal or pentagonal.

14. *ELICA LATIPENNIS*, n. s. Testacea, ex parte fulva, capite suprâ thoracisque disco fuscis, alis hyalinis subtestaceis, venis fulvis, nonnullis nigris.

Testaceous, partly tawny. Head above and disk of the thorax brown. Wings hyaline, with a slight testaceous tinge; veins tawny, some of them black, forming an irregular incomplete band. Length of the body $3\frac{1}{2}$ lines; of the wings 9 lines.

Malacca.

Gen. *ELIDIPTERA*, *Spinola*.

15. *ELIDIPTERA SMARAGDILINEA*, n. s. Ferruginea, capite ex parte prasino, cornu gracili cylindrico ascendente nigro subtus viridi, fronte angustâ, facie pectoreque nigro alboque variis, prothorace maculis tribus prasinis, mesothorace vittâ prasinâ, abdomine vittis duabus prasinis duabusque ventralibus nigris, pedibus viridi-fulvis, femoribus basi nigris, tibiis anticis apice albis, alis hyalinis vittis duabus strigâque transversâ fuscis.

Ferruginous. Head emerald-green about the eyes and on each side of the front; protuberance slender, cylindrical, ascending, black above, green beneath, about twice the length of the head above; front long and narrow; face black and white. Prothorax with an emerald-green spot in the middle and one on each side. Mesothorax with an emerald-green stripe. Pectus black and white. Abdomen with a green stripe on each side, and with a black stripe on each side beneath. Legs tawny; femora black at the base; tibiae and tarsi partly green; fore tibiae white towards the tips. Wings limpid. Fore wings with a narrow brown stripe along the terminal part of the costa, and with a broad brown stripe along the corresponding part of the hind border, the two stripes connected by a brown streak along the transverse veinlets. Length of the body $1\frac{1}{2}$ lines; of the wings 11 lines.

Mount Ophir.

Subtrib. CIXIODES, *Spinola*.Gen. CIXIUS, *Latr.*

16. *CIXIUS PUSTULATUS*, n. s. Fulvus, subtùs testaceus, capite viridescente, guttis duabus nigris, carinis ferrugineis, alis anticis maculis pallidioribus necnon punctis plurimis guttisque paucis nigricantibus, posticis fuscis.

Tawny, testaceous beneath. Head greenish, with a black dot on each side; ridges ferruginous. Fore wings with some paler marks and with many minute blackish dots which are accompanied by two or three larger and darker dots. Hind wings brown. Length of the body 3 lines; of the wings 7 lines.

In this species the veinlets towards the tip of the costa and along the apical margin are more numerous than in the European *Cixii*.

Singapore.

17. *CIXIUS ALBISTRIGA*, n. s. Nigricans, subtùs testaceus, capite parvo, fronte angustâ fuscâ, segmentorum abdominalium marginibus posticis rufescentibus subtùs albidis, alis anticis fuscis, strigis tribus transversis costalibus subapicalibus albidis, posticis cinereis.

Blackish, testaceous beneath. Head much smaller, and with the front much narrower than in the European species; front dark brown. Hind borders of the abdominal segments reddish above, whitish beneath. Fore wings brown, with three whitish transverse streaks towards the tip of the costa. Hind wings grey. Length of the body 2 lines; of the wings 5 lines.

Singapore.

18. *CIXIUS EFFERATUS*, n. s. Testaceus, fronte subfusiformi, oculis magnis approximatis, abdomine fulvo, alis limpidis, venis fulvis, anticis stigmatè testaceo maculisque duabus marginalibus fuscis, posticis strigâ costali apicali fuscâ.

Testaceous. Front subfusiform, attenuated in front. Eyes large, nearly contiguous on the vertex. Abdomen tawny. Wings limpid; veins tawny; stigma testaceous, with a brown spot contiguous to its tip, and opposite a smaller and paler brown spot on the interior border. Hind wings with a brown streak at the tip of the costa. Length of the body $2\frac{1}{2}$ lines; of the wings 6 lines.

Singapore.

Gen. EURIA, n. g.

Caput brevissimum, suprâ arcuatum; frons longa, subfusiformis, carinata. *Antennæ* globosæ. *Thorax* brevissimus, carinatus, lateribus elevatis. *Alæ* antice mediocriter latæ, venis costalibus plurimis ordinariis, marginalibus multis sæpissimè furcatis, discalibus nonnullis, basalibus paucis.

Head very short, arched above. Front long, subfusiform, with a keel in the middle. Antennæ small, globose. Thorax very short, with a keel in the middle and a ridge on each side. Fore wings moderately broad, with the angles rounded; many oblique, parallel, equidistant veins along the costa; veins along the exterior border very numerous, mostly forked, divided by transverse veinlets from the much fewer veins in the next compartment, which is likewise divided by veinlets from the still fewer basal areolets.

19. *EURIA LURIDA*, n. s. Fuscescens, subtùs pallidior, capite viridi carinis fulvis, alis anticis fusco-quadrifasciatis, posticis fusco-trifasciatis.

Brownish, paler beneath. Head green, with tawny ridges. Wings lurid. Fore wings with four brown bands; 1st and 2nd dilated in front; 3rd slender, curved, joined at each end to the 2nd; 4th marginal. Hind wings with three brown bands. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines.

Singapore.

Gen. *BIDIS*, n. g.

Caput conicum, vix ascendens, vertice carinato, fronte perangustâ carinatâ lateribus elevatis. *Antennæ* filiformes; articulus 2^{us} 1^o paullo longior; setâ longissimâ. *Prothorax* arcuatus, brevissimus. *Mesothorax* tricarinatus. *Alæ* antiçæ sat angustæ, areolis nonnullis apud costæ apicem et apud marginem exteriorem; areolæ basales longissimæ, discales elongatæ.

Head conical, hardly ascending, with a ridge above; front very long and narrow, with a middle keel; sides also ridged. Antennæ filiform; 2nd joint a little longer than the 1st; bristle about twice the length of the 2nd, and full $\frac{1}{4}$ ths of the length of the body. Prothorax arched, very short. Mesothorax with three keels. Fore wings rather narrow, with marginal areolets towards the tip of the costa and along the exterior border; discal areolets elongated, less than half the length of the basal areolets.

20. *BIDIS NOTIVENA*, n. s., mas et fem. Testacea, ex parte viridis, alis hyalinis, anticis subtestaceis, venis testaceis ex parte nigricantibus. Mas ex parte rufescens.

Male and female. Testaceous, partly green. Wings hyaline. Fore wings with a very slight testaceous tinge; veins testaceous, here and there blackish.

Male. Partly red. Length of the body 2 lines; of the wings 6 lines.

Singapore and Malacca.

Trib. ISSITES, *Spinola*.

Gen. *EURYBRACHYS*, *Guérin*.

21. *EURYBRACHYS MULTICOLOR*, n. s. Latè viridis, albo-tomentosa, thorace testaceo, abdominis lateribus posticis latè rufis, membranis duabus apicalibus foliaceis fulvis, alis anticis nigro-guttatis, apud costam nigro-strigatis, marginibus latis subhyalinis, posticis albis, maculis nonnullis marginalibus nigris.

Bright green, with white tomentum. Thorax mostly testaceous. Abdomen bright red on each side towards the tip, which has two foliaceous tawny appendages. Fore wings nearly hyaline, with green disks, which are brightest beneath, and with several black discal dots; some little black streaks along the costa. Hind wings white, with some black marginal spots. Length of the body 7 lines; of the wings 22 lines.

22. *EURYBRACHYS RUBRESCENS*, n. s. Testacea, vertice thoraceque rufescente notatis, fronte viridi-testaceâ, pedibus roseis, alis anticis pubescentibus, basi purpureo-rufis nigro-guttatis, apices versus fulvis, fasciâ intermediâ marginibusque ex maximâ parte sordide hyalinis, tuberculis duobus submarginalibus nigro-uniguttatis, posticis lacteo-albis fasciâ fuscâ.

Testaceous. Head, vertex and thorax with reddish marks. Front greenish testaceous. Legs rosy red. Fore wings pubescent, slightly tuberculated, and with a black shining dot near the tip of the costa and at three-quarters of the length of the hind border, purplish red and with black dots towards the base, tawny towards the tips, with a dingy hyaline middle band and with the borders chiefly of the same hue. Hind wings milky white, with a brown band. Length of the body 5 lines; of the wings 18 lines.

Mount Ophir.

Subtrib. FLATOÏDES, *Spinola*.

Gen. FLATOÏDES, *Guérin*.

23. Flatoïdes tenebrosus, *Walk. Cat. Homopt.* pt. 2. 406. 7.

Malacca and Singapore. Inhabits also China.

24. Flatoïdes marginalis, *Walk. Cat. Homopt.* pt. 2. 409. 10.

Mount Ophir. Inhabits also Africa?

25. FLATOÏDES DISCALIS, n. s. Nigra, fronte tricarinatâ marginibus subelevatis, segmentorum abdominalium marginibus posticis pedibusque testaceis, alis anticis nigricantibus disco guttisque quatuor limpidis, punctis marginalibus testaceis, posticis limpidis fusco-marginatis.

Black. Front much broader than long, with a slightly elevated margin, and with three slight keels. Hind borders of the abdominal segments and legs dull testaceous. Fore wings blackish, with a testaceous point on the tip of each vein; disk limpid; two limpid dots on the costa, and two towards the tip of the exterior border. Hind wings limpid with brown borders. Length of the body 3 lines; of the wings 8 lines.

Singapore.

26. FLATOÏDES EMARGINATUS, n. s. Nigricans, capite pectore pedibusque testaceis, fronte carinis tribus abbreviatis, alis nigricantibus, anticis maculâ costali albo-limpidâ, incisuris duabus costalibus exterioribus, margine exteriore anticè concavo posticè dilatato.

Blackish. Head, pectus and legs dull dark testaceous; front about twice broader than long, with an elevated border, and with three short keels on the hind part. Wings blackish. Fore-wings slightly hooked; costa with two slight excavations between the tip and a white limpid spot which is beyond the middle; exterior border concave between the tip, and a conical dilatation which is in front of the middle. Hind wings slightly excavated along the exterior half of the costa. Length of the body 3 lines; of the wings 11 lines.

Singapore.

Gen. RICANIA, *Germar*.

27. Ricania Hemerobii, *Walk. Cat. Homopt.* pt. 2. 425. 19.

Malacca. Inhabits also Ceylon.

Gen. CONNA, n. g.

Corpus sublineare. *Caput* thorace vix angustius, fronte depressâ, elongatâ, carinulâ mediâ, lateribus subelevatis. *Prothorax* arcuatus, carinatus, ver-

tiem posticum superans. *Mesothorax* tricarinatus. *Pedes* breviusculi, sat validi. *Alæ* latæ, apice rotundatæ; anticæ areolis costalibus ordinariis, discalibus plurimis abnormibus.

Body almost linear. Head nearly as broad as the thorax; vertex much longer than broad; front flat, much longer than broad, forming a rounded angle on the middle of each side, with the borders slightly elevated and with a slight middle keel. Antennæ short; 2nd joint much shorter than the 1st; bristle not long. Prothorax keeled, arched, extending over the hind part of the vertex. Mesothorax longer than broad, with three keels. Legs rather short and stout. Wings broad, rounded at the tips. Fore wings with a row of regular areolets along the costa; discal areolets numerous, very irregular in size and shape.

28. *CONNA GUTTIFERA*, n. s. Testacea, capite guttis sex nigris, verticis thoracisque discis fusciscentibus, abdominis vittâ dorsali fuscâ, segmentorum marginibus posticis albidis, alis hyalinis, anticis subtestaceis guttis paucis fusciscentibus, posticarum margine ex parte fusciscente.

Testaceous. Vertex and thorax with brownish disks. Head with two black dots on each side, and four in front. Abdomen with a brown dorsal stripe; hind borders of the segments whitish. Wings hyaline. Fore wings somewhat testaceous, with a few slight brownish dots. Hind wings with a brownish tinge along part of the hind border.

Length of the body $3\frac{1}{2}$ lines; of the wings 9 lines.

Malacca.

Gen. BENNA, n. g.

Corpus sat gracile. *Caput* carinatum, thorace paullo angustius, lateribus elevatis, fronte compressâ elongato-subfusiformi. *Antennæ* breviusculæ. *Thorax* tricarinatus. *Prothorax* brevissimus. *Abdomen* basi halteribus duobus capitatis, oviductu longo arcuato. *Pedes* longiusculi, sat graciles. *Alæ* latæ, apice rotundatæ; anticæ areolis discalibus brevioribus, basalibus et marginalibus longioribus.

Body rather slender. Head a little narrower than the thorax, with a keel which extends from the back of the vertex to the rostrum; sides also ridged; front compressed, elongate-subfusiform. First and 2nd joints of the antennæ a little shorter together than the breadth of the front; bristle not long. Thorax with three ridges. Prothorax very short. Abdomen at the base with two lateral capitate appendages like the halteres of *Diptera*; tip terminating in a long curved oviduct. Legs rather long and slender. Wings broad, rounded at the tips. Fore wings with about twenty areolets, formed by two irregular bands of transverse veinlets; the discal areolets generally shorter than the basal and the marginal areolets.

29. *BENNA CAPITULATA*, fœm. Testacea, abdomine lanuginoso, alis hyalinis, anticis subtestaceis, guttâ discali nigrâ guttulisque duabus fuscis, venis fuscis, basi et apud costam testaceis, venulis transversis ex parte infuscatis, strigâ apud marginem anteriorem fuscâ, stigmate testaceo.

Female. Testaceous. Abdomen with long cottony secretions; capitate appendages with white tips. Wings hyaline. Fore wings with a very slight testaceous tinge; veins brown, testaceous towards the base and in front, with a

black basal dot, and with two smaller brown dots near the base; transverse veinlets partly clouded with brown; a brown streak along the exterior border; stigma testaceous. Length of the body 3 lines; of the wings 8 lines.

Singapore.

Gen. *POCHAZIA*, *Amyot et Serv.*

30. *Pochazia fasciata*, *Fabr. Syst. Rhyn.* 47. 8. (Flata.)

Singapore. Inhabits also Java.

31. *Pochazia fumata*, *Amyot et Serv. Hist. Nat. Hém.* 529. 2. *Flata fuscata?*
Fabr. Syst. Rhyn. 47. 9.

Malacca and Singapore. Inhabits also Java.

32. *Pochazia obscura*, *Fabr. Syst. Rhyn.* 49. 16. (Flata.)

Malacca. Inhabits also Hindostan.

33. *POCHAZIA INTERRUPTA*, n. s. Testacea, fronte elongato-subquadrata, prothorace areuato verticem ex parte superante, mesothorace tricarinato, alis fuscis, anticis apud marginem posticum ex parte luridis, fasciâ interruptâ fuscâ, apice testaceo-hyalino.

Testaceous; vertex much broader than long; front elongate-subquadrate, with a slight groove in the middle. Prothorax arched, extending over part of the vertex. Mesothorax with three slight keels. Wings brown. Fore wings partly lurid towards the hind border; an interrupted band beyond the middle; the tips hyaline, slightly testaceous. Length of the body 3 lines; of the wings 7 lines.

Singapore.

34. *POCHAZIA COSTIMACULA*, n. s. Nigra, capite pedibusque fulvis, vertice fusco margine fulvo, alis nigricantibus, anticis apud margines et apud venulas transversas luridis, maculâ costali albido-hyalinâ.

Black. Head and legs tawny; vertex brown, with a tawny border; front broader than long, with a middle keel and with an elevated margin. Wings blackish. Fore wings mostly lurid along the borders and about the transverse veinlets, and with a whitish hyaline spot on the costa beyond the middle. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines.

Malacca.

35. *POCHAZIA GRADIENS*, n. s. Fulva, subtus testacea, alis nigris, anticis apud costam fulvis.

Tawny, testaceous beneath. Head with a middle keel, and with the margins elevated. Front hardly broader than long; sides rounded. Wings blackish. Fore wings tawny along the costa. Length of the body $2\frac{1}{2}$ lines; of the wings 6 lines.

Singapore.

Gen. *NEPHESA*, *Amyot et Serv.*

36. *Nephesa rosea*, *Spinola, Ann. Soc. Ent. France*, viii. 400. 5. (Ricania.)

Flata matutina, *Walk. Cat. Homopt.* 437. 13.

Singapore. Inhabits also Java.

Gen. FLATA, *Fabr.*37. *Flata obscura*, *Fabr. Syst. Rhyn.* 49. 16.

Singapore. Inhabits also Hindostan.

Gen. COLOBESTHES, *Amyot et Serv.*38. *COLOBESTHES ALBIPLANA*, n. s. Alba, alis anticis apud costam convexis, margine exteriore quadrato, angulo interiore attenuato peracuto, posticis vix acuminatis.

White. Fore wings convex in front, rectangular at the tips, straight and quadrate from thence to the interior angle which is attenuated and very acute; hind border straight. Hind wings hardly acuminate at the tips. Length of the body 5 lines; of the wings 22 lines.

Singapore.

39. *COLOBESTHES MARGINATA*, n. s. Viridi-alba, mesothorace vittis duabus testaceis luteo-unilineatis, alis anticis fasciâ marginali luteâ, basi subtuberculatis, apud costam convexis, margine exteriore quadrato, angulo interiore attenuato acuto.Greenish white. Front not broader than long, with a slightly elevated border and a slight keel; sides slightly rounded. Mesothorax on each side with a testaceous stripe which includes a luteous line. Fore wings minutely tuberculate towards the base, convex in front, rectangular at the tips, straight and quadrate from thence to the hind angle which is attenuated and acute; hind border straight; a pale luteous marginal band extending from $\frac{2}{3}$ ths of the length of the costa nearly to the middle of the hind border. Length of the body 4 lines; of the wings 18 lines.

Malacca.

Gen. PÆCILOPTERA, *Latr.*40. *Pæciloptera maculata*, *Guér. Icon. Règne Anim. Ins.* pl. 58. f. 7.

Malacca and Singapore. Inhabits also Java.

41. *PÆCILOPTERA LUTEIMARGO*, n. s. Subtestaceo-viridis, fronte subcarinata, lateribus subelevatis rotundatis, prothorace arcuato verticem ex parte superante, alis anticis margine exteriore subquadrato, fasciâ apicali luteâ fusco-marginatâ, posticis limpidis.

Green, with a slight testaceous tinge. Front a little longer than broad, with the border slightly elevated, and with a slight keel; sides rounded. Thorax not keeled. Prothorax nearly semicircular, extending over the vertex. Mesothorax broader than long. Fore wings subquadrate at the tips, about which there is a luteous brown-bordered band. Hind wings limpid. Length of the body 3 lines; of the wings 7 lines.

Singapore.

42. *PÆCILOPTERA NIVEINA*, n. s. Alba, *P. luteimarginis* structurâ, alis anticis fasciâ marginali testaceâ.White, in structure like *P. luteimargo*. Fore wings with a testaceous marginal band which extends from two-thirds of the length of the costa to the base of the hind border. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines. Mount Ophir.

Gen. EUPILIS, n. g.

Fœm. Corpus subfusiforme. Caput breve, anticè rotundatum, thorace angustius; vertex depressus, bicarinatus; frons convexa, lavis; facies lanceolata, vix carinata. Antennæ globosæ. Oriductus longus, arcuatus, lanceolatus. Alæ sat angustæ; anticæ apice rotundatæ, venulis quatuor transversis costalibus, venulisque quatuor discalibus.

Female. Body subfusiform. Head nearly semicircular, narrower than the thorax; vertex depressed, with a ridge on each side; front convex, smooth; face lanceolate, hardly keeled. Antennæ globose. Abdomen terminating in a long curved lanceolate oviduct. Wings rather narrow. Fore wings rounded at the tips, with four transverse veinlets along the costa, and with four irregular discal transverse veinlets.

43. EUPILIS ALBILINEOLA, n. s., fœm. Testacea, ex parte viridis, fronte nigrâ, maculâ fulvâ margineque testaceo, facie fasciis duabus (antere maculari) nigris, thorace pectoreque nigro-maculatis, abdomine fasciis nigris, alis hyalinis, venis nigris, anticis subluridis fusco quinque-strigatis, venulis transversis albidis.

Female. Testaceous, partly pale green. Front black, shining, with a tawny central spot and with a testaceous border; face with two black bands, the anterior one macular. Thorax and pectus with black spots. Abdomen with black bands. Wings hyaline, with black veins. Fore wings slightly lurid, with five brown streaks; transverse veinlets white. Length of the body 4 lines; of the wings 7 lines.

Singapore.

Fam. MEMBRACINA, *Burmeister.*Gen. CENTROTUS, *Fabr.*

44. Centrotus Taurus, *Fabr. Syst. Rhyn.* 20. 19.

Mount Ophir and Singapore. Inhabits also Hindostan, Java, the Philippine Isles, and China.

45. CENTROTUS LAMINIFER, n. s. Nigricans, scabrosus, thoracis cornubus anticis divergentibus subplanis membranaceis rufo-fuscis, postico abdomen superante, pedibus ferrugineis, alis luridis, anticis apud costam nigricantibus.

Blackish, scabrous. Thorax armed in front with two almost directly diverging nearly horizontal membranous reddish-brown horns, from each of which a keel proceeds to the tip of the hind horn, which is horizontal and extends beyond the abdomen. Legs ferruginous. Wings lurid. Fore wings blackish along the costa. Length of the body $2\frac{1}{2}$ lines; of the wings 6 lines.

Singapore.

46. CENTROTUS CALIGINOSUS, n. s. Niger, obscurus, brevis, robustus, dense et scitè scaber, thoracis cornubus lateralibus validis abbreviatis divergentibus obliquè ascendentibus, cornu postico abdominis dimidium non superante, alis anticis fuscis, basi nigris, posticis limpidis.

Black, stout, short, dull, thickly and minutely scabrous. Lateral horns of

the thorax stout, diverging, obliquely ascending, shorter than the breadth of the thorax between them; hind horn horizontal, extending to half the length of the abdomen. Tarsi ferruginous. Fore wings brown, black at the base. Hind wings limpid. Length of the body 2 lines; of the wings 4 lines.

Malacca.

47. *CENTROTUS SEMIVITREUS*, n. s. Niger, crassus, brevis, nitens, subtilissimè punctatus, thorace anticè inermi angulato, cornu postico abdomen ferè adæquante, alis hyalinis, anticarum dimidio apicali nigro.

Black, thick, short, shining, very minutely punctured. Thorax unarmed in front, but angular on each side by the base of the fore wing; hind horn horizontal, extending nearly to the tip of the abdomen. Wings hyaline. Fore wings black for half the length from the tips. Length of the body $1\frac{1}{2}$ line; of the wings $3\frac{1}{2}$ lines.

Singapore.

48. *CENTROTUS SEMIFASCIA*, n. s. Niger, obscurus, thorace anticè inermi, cornu postico abdominis dimidium superante; alis hyalinis, anticis guttà costali fascià subapicali apiceque fuscis.

Black, dull. Thorax unarmed in front; hind horn horizontal, extending to rather beyond half the length of the abdomen. Wings hyaline. Fore wings with a brown dot in front, a subapical band, and brown tips. Length of the body 1 line; of the wings $2\frac{1}{2}$ lines.

Malacca.

Gen. MICREUNE, n. g.

Centrote affinis. Thorax anticè lanceolatus; cornu caput longè superans, apud apicem ramis duabus erectis subarcuatis armatum; cornu posticum abdominis dimidio vix brevius.

Allied to *Centrote*. Thorax prolonged into a long, slender, lanceolate horn which extends far beyond the head, and has at its tip two more slender vertical slightly recurved and diverging branches. Hind part of the thorax armed with a horizontal horn which extends to near half the length of the abdomen. Wings fusiform, much like those of *Centrote*.

49. *MICREUNE FORMIDANDA*, n. s. Nigra, thorace scabro, cornibus carinatis, segmentorum abdominalium marginibus posticis genibus tarsisque fulvis, alis anticis nigricantibus, posticis cinereis.

Black. Thorax scabrous; its horns channelled. Hind borders of the abdominal segments, knees and tarsi tawny. Fore wings blackish. Hind wings grey. Length of the body lines; of the wings lines.

Singapore.

Fam. CICADELLINA, Burmeister.

Trib. LEVIPEDES, Amyot et Serv.

Subtrib. CERCOPIDES, St. Farg. et Serv.

Gen. CERCOPIIS, Fabr.

50. *Cercopis tricolor*, St. Farg. et Serv. Enc. Méth. x. 604. 1.

Var. Alis anticis nigris guttis sex basalibus rufis.

Var. Black, shining. Head, thorax, scutellum towards the tip, hind borders of the abdominal segments, and tip of the abdomen, red, as are also the legs. Femora black, the four anterior red towards the tips. Fore wings with six red dots on each at the base.

Mount Ophir. Inhabits also Java.

51. *Cercopis plana*, *Walk. Cat. Homopt.* pt. 3. 653. 10.

Var. Thorax nigro-bipunctatus.

Var. Scutum of the mesothorax with two black points.

Mount Ophir. Inhabits also Java.

52. *Cercopis dorsinacula*, *Walk. Cat. Homopt.* pt. 2. 658. 31.

Malacca. Inhabits also North Bengal.

53. *Cercopis costalis*, *Walk. Cat. Homopt.* pt. 2. 664. 45.

Var. Ake anticae guttis duabus subapicalibus rufis.

Var. Fore wings with two red subapical dots.

Inhabits also Malabar.

54. *CERCOPIS RUGULOSA*, n. s. Nigra, nitens, subtus ferruginea, abdominis marginibus pedibusque rufis, femoribus vittâ nigricante, alis anticis rugulosis.

Black, shining, ferruginous beneath. Abdomen bordered with red. Legs red; a blackish band on each of the femora. Fore wings rugulose. Length of the body 5 lines; of the wings 14 lines.

Mount Ophir.

Nearly allied to *C. viridicans*, Guér., but without any tinge of green.

55. *CERCOPIS DISLOCATA*, n. s. Nigra, capite fasciâ verticis marginibusque anticis testaceis, thorace testaceo maculis duabus anticis nigris, alis anticis costâ testaceâ, fasciis duabus vittâque obliquâ dislocatâ rufis.

Black. Head testaceous, black across the vertex and on each side in front. Thorax testaceous, with a black spot on each side in front. Fore wings testaceous along the costa, with two red bands, and with a red oblique stripe which extends from near the base of the wing to the hind end of the 2nd band, and is dislocated as it traverses the 1st band. Length of the body 6 lines; of the wings 14 lines.

Singapore.

56. *CERCOPIS UNIFASCIA*, n. s. Rufa, thoracis lateribus dilatatis, pectoris disco nigro, alis anticis fasciâ nigrâ, posticis hyalinis.

Red. Thorax dilated on each side. Disk of the pectus black. Fore wings with a black band across the middle. Hind wings hyaline. Length of the body 6 lines; of the wings 12 lines.

Singapore.

57. *CERCOPIS DISCREPANS*, n. s. Nigro-purpurea, subtus nigra, alis anticis nigris maculâ elongatâ nonnunquam divisâ rufâ.

Blackish-purple, black beneath. Fore wings black, with an elongated red spot, which is contracted in the middle, and occasionally divided. Length of the body 3-3½ lines; of the wings 8-9 lines.

Singapore.

Gen. COLSA.

Corpus subfusiforme. *Caput* sat magnum, thorace paullo angustius; vertex depressus; frons convexa; facies brevi-conica, lateribus impressis. *Antennæ* brevissimæ; seta brevis. *Prothorax* brevis, anticè angustior. *Mesothorax* subpunctatus; scutellum excavatum. *Alæ* angustæ, apice rotundatæ, anticæ venulis nonnullis costalibus apicalibus venisque quatuor longitudinalibus, 1â 2âque furcatis.

Body subfusiform, shining. Head rather large, a little narrower than the thorax; vertex somewhat depressed; front convex; face short-conical, impressed on each side. Antennæ very short; bristle shorter than the breadth of the head. Prothorax narrower in front, about six times broader than long. Mesothorax minutely punctured; scutellum with a fusiform depression. Wings narrow, rounded at the tips. Fore wings with four longitudinal veins; 1st springing from the middle of the costa, emitting a fork towards the tip of the costa, and ending at somewhat behind the tip of the wing; 2nd forked near the base, springing from near the base of the costa; the forks connected by a veinlet at half their length; the fore fork emitting a branch to the 1st vein; 3rd slender, springing from near the base of the costa, ending on the hind border with a veinlet which connects it with the hind fork of the 2nd vein; 4th springing from very near the base of the costa, and extending obliquely to the hind border; several oblique veinlets at the tip of the costa.

58. COLSA COSTÆSTRIGA, n. s. Nigra, subtus testacea, prothorace scutelloque testaceis, abdomine testaceo fasciâ nigrâ, coxis femoribusque testaceis, alis limpidis, venis nigris crassis, costâ nigrâ, stigmate albido-testaceo.

Black, testaceous beneath. Prothorax and scutellum testaceous. Abdomen testaceous, with a black band. Legs black; coxæ and femora testaceous. Wings limpid; veins black, thick; costa black; stigma whitish testaceous. Length of the body $2\frac{1}{2}$ lines; of the wings $6\frac{1}{2}$ lines.

Malacca.

Subtrib. APHROPHORIDES, *Amyot et Serr.*Gen. PTYELUS, *St. Farg. et Serr.*

59. PTYELUS BIPARS, n. s. Testaceus, capite suprâ thoraceque testaceis, pectore testaceo-bivittato, alis anticis vittâ brevi posticâ fasciâque testaceis, posticis fusciscentibus.

Black. Head above and thorax testaceous. Pectus with a testaceous stripe along each side. Fore wings with a testaceous stripe which extends along half the length of the hind border from the base, and is united to a testaceous band across the middle. Hind wings brownish. Length of the body 4 lines; of the wings 9 lines.

Singapore.

60. PTYELUS IMMUTATUS, n. s. Testaceus, capite subtus nigricante, pectore ex parte abdomineque nigris, tibiis apice nigris, alis anticis subpubescentibus, posticis cinerascenscentibus.

Testaceous. Head blackish beneath and with the usual ridges. Pectus partly black. Abdomen black. Tibiæ black at the tips. Fore wings minutely

pubescent. Hind wings greyish. Length of the body $3\frac{1}{2}$ lines; of the wings 8 lines.
Singapore.

Subtrib. SERRIPEDES, *Amyot et Serv.*

Coh. TETTIGONIDES, *Amyot et Serv.*

Gen. TETTIGONIA, *Germar.*

61. *Tettigonia farinosa*, *Fabr. Syst. Rhyn.* 70. 41. *T. brevifrons*, Walk. Cat. Homopt. 754. 41.—*T. nigrifrons*, Signoret, Ann. Soc. Ent. Fr. 3^{me} sér. i. 671. 123. pl. 21. f. 14.

Malacca and Singapore. Inhabits also Java, Pulo-Pinang, and Sumatra.

M. Signoret apparently describes the male of this species as *T. farinosa*, and the female as *T. nigrifrons*.

62. *Tettigonia ferruginea*, *Fabr. Syst. Rhyn.* 69. 36. (Cicada.)

Singapore. Inhabits also Hindostan, Java, the Philippine Isles, and China.

63. TETTIGONIA TRIPARS, n. s. Latè rufa subtùs ænea, capite brevi rotundato vittis duabus nigris, fronte testaceâ margine nigricante, abdomine obscure rufo fasciis nigricantibus apice æneo, pedibus testaceis, tarsis nigris, alis anticis testaceis glaucescentibus basi rufis, posticis fuscis.

Bright red, dark æneous beneath. Head short, rounded, nearly semicircular; vertex with two black stripes; front dull testaceous, with a blackish border. Abdomen dull dark red, with blackish bands; tip æneous. Legs dark testaceous; tarsi black. Fore wings dull testaceous, with a glaucous bloom, bright red at the base. Hind wings brown. Length of the body 5 lines; of the wings 10 lines.

Malacca.

64. TETTIGONIA SUAVISSIMA, n. s. Nigra subtùs alba, capite brevi-conico vittâ guttisque duabus nigris, thoracis lateribus luteis, pectore maculis nigris, abdomine luteo maculis lateralibus fasciâ rufâ apice albo, alis anticis fuscis apices versus pallidioribus strigâ obliquâ rufâ anticè limpidis costâ luteâ, posticis fuscis apud costam limpidis basi nigricantibus.

Nearly allied to *T. semiclara*, Signoret, and to *T. stellata*, Sign., and forming with them a distinct group in the genus. Black, white beneath. Head short-conical, rounded in front, white with a black stripe and two black dots. Thorax luteous on each side. Pectus with black spots. Abdomen luteous with black spots on each side, red towards the tip which is white. Legs white. Fore wings dark brown, paler brown with an oblique red streak towards each tip, interruptedly limpid along the costa which is luteous. Hind wings brown, limpid along the costa, blackish at the base. Length of the body 4 lines; of the wings 10 lines.

Singapore.

65. TETTIGONIA JOCOSA, n. s. Rufa subtùs alba, capite albo brevi rotundato lateribus nigris, thorace vittis quinque testaceis duabusque albis, pedibus albis, alis anticis albo-vittatis fasciâ luridâ basi testaceis apice fuscis, posticis cinereis.

Red, white beneath. Head white, short, rounded, nearly semicircular; front

black on each side. Thorax with five testaceous stripes and with two white stripes. Legs white. Fore wings with several various white stripes, testaceous at the base, lurid towards the tips which are brown. Hind wings dark grey. Length of the body 3 lines; of the wings 7 lines.

Mount Ophir.

Coh. SCARIDES, *Amyot et Serv.*

Gen. LEDRA, *Fabr.*

66. LEDRA CULTELLIFERA, n. s. Testacea punctis pallidioribus, capite conico, scutello attenuato, oviductu fulvo apice nigro, alis anticis subtuberculatis, posticis limpidis.

Testaceous. Head and thorax with minute paler dots. Head conical, broader than long. Scutum about twice broader than long. Scutellum attenuated and acuminate at the tip. Oviduct tawny, with a black tip. Fore wings very minutely tuberculate. Hind wings limpid. Length of the body $6\frac{1}{2}$ lines; of the wings 12 lines.

Singapore.

67. LEDRA CONIFERA, n. s. Fulva tuberculis pallidis, subtus testacea, capite conico, alis anticis testaceis venis ex parte rufescentibus, posticis limpidis.

Tawny, testaceous beneath. Head and thorax thickly covered with very minute pale tubercles. Head conical, hardly broader than long. Scutum not twice broader than long. Scutellum acuminate. Fore wings testaceous, very minutely tuberculate; veins partly reddish. Hind wings limpid. Length of the body 6 lines; of the wings 10 lines.

Singapore.

68. LEDRA NIGRILINEA, n. s. Testacea subpunctulata, capite sentique lateribus nigro marginatis, capite brevi-conico, alis posticis limpidis.

Testaceous, very minutely punctured. Head and sides of the scutum bordered with black. Head short-conical, twice broader than long. Scutum not twice broader than long. Scutellum acuminate. Hind wings limpid. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

Singapore.

Gen. PENTHIMIA, *Germer.*

69. PENTHIMIA CASTANEA, n. s. Ferruginea laevis nitens, capite anticè subtusque pectoris margine antico maculisque duabus nigris, pedibus nigris, tibiis spinosissimis, alis anticis apices versus luridis maculis nigris.

Ferruginous, smooth, shining. Head black in front and beneath. Pectus black in front and with a black spot on each side behind. Legs black; tibiae very spinose. Fore wings lurid, and with black spots towards the tips. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

Malacca.

Coh. IASSIDES, *Amyot et Serv.*

Gen. ACOCEPHALUS, *Germer.*

70. Acocephalus olivaceus, *Walk. Cat. Homopt.* pt. 3. 816. 1.

Malacca. Inhabits also the Philippine Islands.

Gen. CÆLIDIA, *Germar.*

71. CÆLIDIA GUTTIVENA, n. s., fœm. Nigro-ænea, capite viridi-testacco, verticis guttis duabus frontisque vittis duabus rufis, thorace punctis testaceis, pectore abdomineque testaceis ex parte nigris, pedibus testaceis, tibiis tarsisque apice nigris, alis anticis hyalino-bifasciatis apicibus semihyalinis venis nigris luteo-guttatis, posticis cinerascensibus.

Female. Blackish-æneous. Head greenish testaceous, with two red spots on the vertex, and with two red stripes in front. Thorax thickly covered with testaceous points. Pectus and abdomen testaceous, partly black. Legs testaceous; tips of the tibiæ and of the tarsi black. Fore wings with two hyaline bands, and with semihyaline tips; veins black, with very numerous luteous dots. Hind wings greyish. Length of the body $3\frac{1}{2}$ lines; of the wings 8 lines.

Malacca.

72. CÆLIDIA PUNCTIVENA, n. s., fœm. Nigro-ænea, capite testaceo strigis tribus abbreviatis nigris, thorace punctis testaceis, pectore et abdomine nigris ex parte testaceis, pedibus nigricantibus, alis anticis testaceo-guttatis venis luteo-guttatis, posticis cinerascensibus.

Female. Blackish-æneous. Head dull testaceous, with three short black streaks between the eyes. Thorax thickly covered with testaceous points. Pectus and abdomen black, partly testaceous. Legs blackish. Fore wings with numerous minute testaceous dots between the veins which are black, with minute luteous dots. Hind wings greyish. Length of the body 4 lines; of the wings 9 lines.

Malacca.

Ord. PHYTOPHTHIRE, *Burmeister.*Fam. COCCIDÆ, *Leach.*Gen. MONOPHLEBUS, *Leach.*

73. Monophlebus atripennis, *Klug, Handb.* ii. 80.

Malacca and Singapore. Inhabits also Hindostan.

DESCRIPTION OF PLATES.

PLATE III.

Fig. 1. *Eupilis albilineola*, p. 93; 1*a*, head and rostrum seen in front; 1*b*, the same seen sideways; 1*c*, the extremity of the body seen sideways.

Fig. 2. *Microne formidanda*, p. 94.

Fig. 3. *Benna capitulata*, p. 90; 3*a*, the head and rostrum seen in front; 3*b*, the same seen sideways; 3*c*, the abdomen seen beneath.

Fig. 4. *Cromna acutipennis*, p. 85; 4*a*, the head and rostrum seen in front; 4*b*, the same seen sideways; 4*c*, the abdomen seen sideways.

Fig. 5. *Colobesthes marginata*, p. 92; 5*a*, the head and rostrum seen in front; 5*b*, the same seen sideways; 5*c*, the abdomen seen sideways.

PLATE IV.

- Fig. 1.* *Colsa costastriga*, p. 96; *1a*, the head and rostrum seen in front; *1b*, the same seen sideways.
- Fig. 2.* *Bidis notivena*, p. 88; *2a*, the head and rostrum seen in front; *2b*, the same seen sideways.
- Fig. 3.* *Conna guttifera*, p. 90; *3a*, the head and rostrum seen in front; *3b*, the same seen sideways.
- Fig. 4.* *Elica latipennis*, p. 86; *4a*, the head and rostrum seen in front; *4b*, the same seen sideways.
- Fig. 5.* *Daradax fusipennis*, p. 86; *5a*, the head and rostrum seen in front; *5b*, the same seen sideways; *5c*, the extremity of the abdomen seen sideways.
- Fig. 6.* *Euria lurida*, p. 88; *6a*, the head and rostrum seen in front; *6b*, the same seen sideways; *6c*, the extremity of the abdomen seen sideways.

On the Occurrence of *Sepia biserialis* in Cornwall.

By JONATHAN COUCH, Esq., F.L.S. &c.

[Read March 4th, 1856.]

It appears from the "History of British Mollusca," by Professor E. Forbes and Mr. Hanley (vol. iv. p. 241, and Pl. P.P.P.), that the *Sepia biserialis* is regarded as of very rare occurrence in Britain; one specimen only of its shell or plate having been found in England and three in Ireland. The English specimen was obtained on the shore of the county of Northumberland. It may therefore be regarded as of some importance in the completion of our local fauna, to make the Linnean Society acquainted with the fact, that in the course of two days in the month of February of the present year I have myself found no less than ten specimens of the dorsal plate or shell of this animal, scattered among perhaps a hundred of those of the Common Bone or Burn Cuttle, *Sepia officinalis*.

My attention was attracted to these specimens by the beautiful pale pink colour of the dorsal aspect of the shell; and a very slight examination of the most perfect specimen I could find, compared with those of the common species, was sufficient to point out the decided distinction there is between them; but as the shell of this species is but little known, and those which have fallen into my hands are slightly different from what is described in the work above referred to, I beg leave to lay before the Society a more particular description than might otherwise be necessary.

The length of this shell, as described by Professor Forbes, was

$2\frac{1}{2}$ inches, and the breadth (I suppose without the membranous wing) was $\frac{1}{12}$ ths of an inch; but in the most perfect of my specimens, which however is defective at its blunt end, the length is 4 inches, and the breadth, including the membranous border, $1\frac{5}{8}$ inch. The form is much more slender than in the common species, and, as it approaches the mucro or spur, may be described as lancet-shaped. The spur projects much more considerably than in the *Sepia officinalis*, although in the latter I find a difference in different specimens. In the *S. biserialis* it advances $\frac{1}{8}$ th of an inch beyond the membranous border in a straightforward direction, whereas in the *S. officinalis* it is depressed and bent inward. The membranous border at this part is also turned inward, so as to enclose a cavity, and conceal the narrower portion of the shell. The structure of this spur in the *S. biserialis* is also different; for while that of the common species is for the most part hooked, round and simple, in the *S. biserialis* it is slightly lobed or keeled. I have not been able to assure myself of its shape at the point, as in my most perfect specimen it was a little injured.

In addition to these well-marked distinctions, the rarer species is smooth on its dorsal aspect at that part where the more common is covered with a decided graining. The transverse striae are also much more numerous, and of a finer structure. Their direction also at the sides is not so bent towards the slender extremity.

It is still a subject of interesting inquiry whether the animal to which this shell or plate belongs is truly a native of our own waters, since it does not appear that any observer has ascertained its existence. It is to be observed; however, that although the whole of these specimens were injured, and most of them much broken, they were scarcely more so than were those of the common species, which is, beyond question, common on our coasts. The two species were lying together on the beach, as they had been left by the tide; and although there were at no great distance from them many specimens of the stalks of the American maize, clothed with perfect leaves—and although without heads of grain, still bearing clumps of the male flowers,—yet we cannot conclude from the presence of these foreign plants that the shells can have come to us from a considerable distance, since those of the *Sepia officinalis* certainly have not done so, and the leaves and stalks of the plants bear no marks of long immersion or of a distant voyage. It is probable that they were thrown overboard from

some ship, as is often the case with foreign productions which we find cast up on our shores.

Polperro, 1856.

Notice of the "Borer," a Caterpillar very injurious to the Sugar-Cane. By J. O. WESTWOOD, Esq., F.L.S. &c.

[Read June 3rd, 1856.]

[Abstract.]

MR. WESTWOOD gave an account of the natural history of the "Borer," or caterpillar of a moth which is at the present time doing immense damage to the sugar-canes in the island of Mauritius. A committee had been formed in the island, composed of the chief planters and scientific individuals, for the purpose of investigating the subject, and from the able report which they had drawn up, it appears that the insects were in all probability imported with a cargo of new cane plants from the island of Ceylon several years ago, and that since that time the damage has been rapidly extending, and now threatens the entire destruction of the plantations. The female insect deposits her eggs in the axils of the young leaves, and the larvæ as soon as hatched bore into the stem, forming long galleries filled with the excrement of the insect, and which have the effect of bringing the stem into such a state of disease, that no crystallization will take place, and the plant becomes quite useless even for making rum. The entire transformations of the insect are effected in about six weeks, so that there are at least six successive generations in the course of a year. It appears that the chrysalis state is passed in a slight cocoon spun amongst the dead leaves of the plant; and the committee, after reviewing various proposals suggested for the destruction of the insect, had come to the conclusion that a well-organized system of burning the infested canes, as well as all loose rubbish and leaves in the plantation, was the only practicable means of getting rid of the enemy. Dr. Ulcoq, an extensive sugar-cane planter in the island, who was present at the meeting, confirmed the details contained in the report, and begged for any suggestions which could be offered by scientific men in this country for the purpose of remedying the evil. He had already been in communication with M. Guérin-Méneville and other naturalists in Paris.

Several of the members present took part in the discussion

upon the subject, and especially dwelt on the care necessary in the selection and treatment of the cuttings of the cane-tops for future plantations. The destruction of the eggs and young larvæ attached to such shoots would be effected if the latter were kept immersed in damp furrows, but the nature of the soil of the island prevented such a process; their immersion in a liquid capable of destroying the insect embryo without hurting the plant was also insisted upon; as well as the placing of the cuttings for a time in a close atmosphere saturated with the fumes of prussic acid arising from bruised laurel-leaves, which would certainly destroy the insect.

From the account given of this Mauritian borer, it appears identical with the borer of the West Indian plantations described by Fabricius under the name of *Phalæna saccharalis*, and by the Rev. L. Guilding under that of *Diatræa Sacchari* in a memoir published in the Transactions of the Society of Arts, for which he received the Gold Ceres Medal from the Society.

Notice of a Specimen of Insect-wax from China.

By DANIEL HANBURY, Esq., F.L.S. &c.

[Read April 15th, 1856.]

[Abstract.]

MR. D. HANBURY exhibited a specimen of Chinese Insect-wax in the crude state, attached to the branch on which it had been formed by the insect, *Coccus Pe-la*, Westw.* (*C. sinensis*, Westw. Pharm. Journ. xii. 478).

The specimen was obtained by Dr. M'Cartee of Ningpo, at a spot about fourteen miles N.E. of that city. The exact locality is described as "three miles from Chin-hae, southerly, behind the first range of hills across the river,—in the direction of Ling-fung," where the trees supporting the wax-insect occur on the banks of the canals.

Dr. M'Cartee procured specimens for Mr. Fortune, which that gentleman has taken to India with the view of introducing the insect into that country. He also sent specimens to William Lockhart, Esq., of Shanghai, through whose kindness that exhibited was received.

It may be remarked that, according to the Chinese accounts

* Gardener's Chronicle for Aug. 20, 1853 (p. 532).

the trees upon which the wax-insect lives are of two or three species. Of one of these, resembling an ash, a dried specimen was on the table. Mr. Lockhart has in his garden at Shanghai a small wax-tree of this species which he hopes shortly to colonize with the wax-insect. The tree has not yet flowered, and its botanical position is as yet undetermined. A living plant of the same species was brought to England by Mr. Fortune, from whose hands it passed into those of Messrs. Rollisson and Sons of Tooting.

Specimens of the manufactured insect-wax from China were also on the table.

Note on Insects producing Wax from Port Natal and China.

By J. O. WESTWOOD, Esq., F.L.S. &c.

[Read April 15th, 1856.]

THE wax-insect from Natal, exhibited by Mr. W. W. Saunders, is the female of a large species of *Coccus*, analogous to the *Coccus ceriferus*; each female being about the size of a pea, and of a dark chestnut colour, but encased in a solid layer of white waxy matter nearly a quarter of an inch thick, so as to make the entire insect as large as a boy's marble; the under side being flattened, or rather concave, so as to fit the convex surface of the branch on which they are found. The size of the insect would render it easy of observation, and the thickness of the wax would make it a more important object of commerce than the wax-insects of South America.

The Chinese wax-insect, of which so fine a specimen on the branch has been exhibited by Mr. Daniel Hanbury, differs from the latter by the waxy matter being deposited over the surface of the branch, and not confined to a coating of the insect. The specimens submitted to my examination are probably of considerable age, as they have been much deteriorated in a commercial point of view, by being attacked by other insects, namely a species of ant, of which I found the heads and other parts of several specimens; and a species of moth, of which I found portions of many chrysalides; the larvæ of which, I do not doubt, had devoured the animal matter of the *Cocci*, as well as burrowed into the wax. There were also some fragments of a *Curculio* (*Otiorhynchus*?), but these, I suppose, must have been taken accidentally on the trees in collecting the *Cocci*.

Catalogue of the Dipterous Insects collected at Sarawak, Borneo,
by Mr. A. R. WALLACE, with Descriptions of New Species.
By FRANCIS WALKER, Esq., F.L.S.

[Received Sept. 15, 1856.]

Fam. MYCETOPHILIDÆ, *Haliday*.

Gen. SCIARA, *Meigen*.

Div. A. a. *Meig.* vi. 305.

1. SCIARA LATICORNIS, n. s., mas et fœm. Nigra, antennis validis, thorace nitido. Mas. Alis subnigricantibus. Fœm. Abdomine ferrugineo, alis nigricantibus.

Male and Female. Black. Antennæ stout. Thorax shining. *Male.* Wings slightly blackish. *Female.* Abdomen ferruginous. Wings blackish. Length of the body 3-4 lines; of the wings 5-6 lines.

2. SCIARA SOLITA, n. s., fœm. Nigra, antennis gracilibus, thorace abdominisque apice subnitidis, pedibus piceis, alis subnigricantibus.

Female. Black. Antennæ slender. Thorax and tip of the abdomen slightly shining. Legs piceous. Wings slightly blackish. Length of the body $1\frac{1}{4}$ line; of the wings 3 lines.

Fam. CECIDOMYZIDÆ, *Haliday*.

Gen. CECIDOMYIA, *Latreille*.

3. CECIDOMYIA DEFERENDA, n. s., fœm. Fusca, capite nigro, thorace rufescente, pedibus testaceis, alis albidis, venis halteribusque testaceis.

Female. Brown. Head black. Thorax reddish. Legs testaceous. Wings whitish, ciliated; veins and halteres pale testaceous; subcostal vein ending at a little before the middle of the costa; cubital vein ending at the tip of the wing; hind branch of the anal vein straight, and proceeding obliquely to the hind border. Length of the body $1\frac{3}{4}$ line; of the wings $3\frac{1}{2}$ lines.

Fam. BIBIONIDÆ, *Haliday*.

Gen. PLECIA, *Hoffmansegg*.

4. PLECIA dorsalis, *Walk.* See page 5.

5. PLECIA SUBVARIANS, n. s., mas et fœm. Atra. Mas. Thorace rufo, alis subnigricantibus. Fœm. Thorace rufescente, alis nigricantibus.

Male and Female. Deep black. *Male.* Thorax bright red. Wings slightly blackish. *Female.* Thorax dull red. Wings blackish. Length of the body $1\frac{1}{2}$ -2 lines; of the wings 4-5 lines.

This species may be distinguished from *P. dorsalis* by its narrower wings.

Fam. CULICIDÆ, *Haliday*.

Gen. CULEX, *Linn.*

6. Culex fuscus, *Wied.* See page 5.

Fam. TIPULIDÆ, *Haliday*.Gen. LIMNOBIA, *Meigen*.

Div. n.

Veins of the wings like those of Div. S. *Meig.* (*Zweifl.* i. 117. pl. 4. f. 17), with the exception of the subcostal vein, which is not connected with the costal, but emits a veinlet at its tip to the radial.

7. LIMNOBIA IMPRESSA, n. s., fœm. Fusca, capite nigro, thoracis lateribus testaceo-marginatis, pectore cano, abdomine lutescente fasciis fuscis, pedibus pallidè fusciscentibus, genubus testaceis, alis subcinereis venis nigris.

Female. Brown. Head and antennæ black. Lateral segments of the thorax with testaceous borders. Pectus hoary. Abdomen somewhat luteous, with brown bands. Legs slender, pale brownish; knees testaceous. Wings greyish; veins black. Length of the body $4\frac{1}{2}$ lines; of the wings 8 lines.

Div. n.

Veins of the wings much like those of Div. E. *Meig.* (*Zweifl.* i. 125. pl. 6. f. 2), but the veinlet which connects the subcostal vein with the radial is far beyond the base of the fork of the latter, the cubital parts from the radial at some distance from the veinlet which connects it with the 3rd externo-medial, and the veinlet between the 3rd externo-medial and the subanal is very near the base of the discal areolet.

8. LIMNOBIA RUBRESCENS, n. s., mas. Ferruginco-rufa, capite pedibusque nigris, pectore ventre femoribus basi coxisque rufescentibus, abdomine vittâ dorsali nigricante, alis fusco-cinereis venis stigmatæque nigricantibus.

Male. Ferruginous red, paler beneath. Head, antennæ and legs black. Abdomen with a blackish stripe. Femora at the base and coxæ reddish. Wings brownish-grey; veins and stigma blackish. Length of the body 5 lines; of the wings 12 lines.

Div. n.

Veins of the wings much like those of Div. E. *Meig.* (*Zw.* i. 125. pl. 6. f. 2), but the veinlet which connects the subcostal vein with the radial is beyond the base of the fork of the latter, and the veinlet between the 3rd externo-medial vein and the subanal is opposite the middle of the discal areolet.

9. LIMNOBIA PYRRHOCHROMA, n. s., mas. Ochraceo-rufa, capite nigro?, pedibus nigris, femoribus basi coxisque fulvis, alis cinereis venis fuscis.

Male. Ochraceous red. Head black? Legs black, slender; femora towards the base and coxæ tawny. Wings grey; veins brown. Length of the body $3\frac{1}{2}$ lines; of the wings 8 lines.

Div. n.

Differs from all the other divisions of *Limnobia* by the contorted petiole of the radial and cubital veins, and by the radial vein which near its base forms an angle emitting a branch; externo-medial veins simple; discal areolet sub-

hexagonal, about twice longer than broad; veinlet between the 3rd externo-medial vein and the subanal near the base of the discal areolet.

10. *LIMNOBIA ARGENTO-CINCTA*, n. s., fem. Nigra, antennis verticillato-pilosis, thorace nitido, abdomine fasciis argenteis, femoribus subelavatis, alis cinereis venis nigris nebulosis.

Female. Black. Antennæ verticillate-pilose. Thorax shining. Abdomen with silvery bands. Femora subelavate. Wings grey; veins black, slightly clouded with black. Length of the body $3\frac{1}{2}$ lines; of the wings 6 lines.

Gen. *PTEROCOSMUS*, *Walk.*

Limnobia leucotelus and *L. plecioides*, p. 6, and other species, may be placed in this genus; the structure of their wing-veins differs somewhat from that of Meigen's Div. 1.

11. *PTEROCOSMUS LUNIGERUS*, n. s., mas. Ater, pedibus piceis, alis violaceo-nigricantibus apice testaceis maculâ discali sublunatâ albâ.

Male. Deep black. Legs piceous. Wings black, with violet reflections, testaceous at the tips, and with a white slightly curved discal white spot. Length of the body 5 lines; of the wings 8 lines.

12. *PTEROCOSMUS INFIXUS*, n. s., mas et fem. Niger, thorace ferrugineo, abdomine anteo flavescente, vittâ viridi, pedibus ferrugineis, femoribus tibiisque apice tarsisque nigris, alis violaceo-nigricantibus fasciâ brevi discali maculâque subapicali albis. Fem. Abdominis segmentis posterioribus nigris fulvo marginatis, terebrâ ferrugineâ.

Male and Female. Black. Thorax and legs ferruginous. Abdomen towards the base yellowish, and with a green stripe. Tarsi and tips of the femora and of the tibiæ black. Wings blackish, with violet reflections, adorned with a short white discal band and with a subapical white spot.

Female. Hinder segments of the abdomen black, with tawny borders; oviduct ferruginous. Length of the body 5-6 lines; of the wings 10 lines.

13. *PTEROCOSMUS OPTABILIS*, n. s., mas. Ater, abdomine luteo basi fasciâque latâ posticâ atris, pedibus piceis, alis nigricantibus apice subemereis fasciâ brevi discali albâ.

Male. Deep black. Abdomen luteous, black at the base, and with a broad black posterior band. Legs piceous, very slender. Wings blackish, with violet reflections, greyish hyaline at the tips, with a limpid mark by the interior angle, and with a short white discal band. Length of the body 3 lines; of the wings 6 lines.

14. *PTEROCOSMUS COMBINATUS*, n. s., fem. Saturatè rufo-ferrugineus, capite nigro, abdomine fasciâ anticâ testaceâ, terebrâ pedibusque pallidè fulvis, alis violaceo-nigricantibus guttis costalibus et marginalibus maculâ discali humilâque subapicali albis costâ testaceâ.

Female. Deep reddish ferruginous. Head and antennæ black. Abdomen with an anterior testaceous band. Oviduct, legs and halteres pale tawny. Tarsi blackish towards the tips. Wings blackish, with violet reflections, with a few marginal white dots, with two white spots (one discal, the other

subapical), and with a limpid mark on the hind part of the base; costa testaceous. Length of the body 8 lines; of the wings 12 lines.

15. *PTEROCOSMUS DILUTUS*, n. s. Saturatè rufus, capite nigro, antennis pedibus halteribusque testaceis, alis cinereis costâ testaceâ venulis transversis nigricante nebulosis maculâ discali guttisque marginalibus albis.

Nearly allied to the preceding species, of which it may be an immature variety. Deep red. Head black. Antennæ, legs and halteres pale testaceous. Tarsi a little darker towards the tips. Wings greyish, pale testaceous along the costa, with a discal white spot, and with some white marginal dots of various size; transverse veinlets slightly clouded with black. Length of the body 6 lines; of the wings 10 lines.

Gen. *TIPULA*, *Linn.*

16. *Tipula pedata*, *Wied. Auss. Zweifl.* i. 45. 7.

Inhabits also Java.

17. *TIPULA VILIS*, n. s., mas. Fusca, antennis subverticillato-pilosis, thorace ferrugineo nitido, femoribus basi fulvescentibus, alis subcinereis venis stigmatæque nigris.

Male. Brown. Antennæ short, slightly verticillate-pilose. Thorax ferruginous, shining. Legs slender; femora somewhat tawny towards the base. Wings very slightly greyish; stigma and veins black. Length of the body 4 lines; of the wings 10 lines.

Fam. *STRATIOMIDÆ*, *Haliday.*

Gen. *PTILOCERA*, *Wied.*

18. *Ptilocera quadridentata*, *Fabr.* See page 7.

Gen. *CLITELLARIA*, *Meigen.*

19. *Clitellaria varia*, *Walk.* See page 7.

20. *Clitellaria flaviceps*, *Walk.* See page 7.

21. *CLITELLARIA NOTABILIS*, n. s., fœm. Nigro-cyanea, capite halteribusque pallidè testaceis, antennis pedibusque nigris, abdomine cyaneo, alis fuscis costam versus nigricantibus.

Female. Blackish-blue. Head pale testaceous. Antennæ and legs black. Thorax with a band and a stripe of grey tomentum. Abdomen blue, with grey tomentum beneath. Wings dark brown, blackish along the costa. Length of the body 5 lines; of the wings 10 lines.

Gen. *CYCLOGASTER*, *Macquart.*

22. *CYCLOGASTER DETRACTA*, n. s., fœm. Nigra, cinereo-pubescent, antennis fulvis, aristâ albidâ elongatâ tenui, pedibus albidis, coxis femoribusque nigris, alis subcinereis venis sordidè albidis.

Female. Black, with grey down. Head shining. Antennæ tawny; arista

whitish, elongated, filiform. Legs whitish; coxæ and femora black. Wings very slightly greyish; veins dingy whitish. Halteres whitish. Length of the body 2 lines; of the wings 4 lines.

23. *CYCLOGASTER INFERA*, n. s., fœm. Nigra cinereo-pubescent, antennis nigris, articulo 1^o fulvo, 3^o valido; pedibus albidis, coxis femoribusque nigris, alis limpidis venis albidis.

Female. Black, with grey down. Head shining. Antennæ black; 1st joint tawny; arista stout. Legs whitish; coxæ and femora black. Wings limpid; veins whitish. Halteres white. Length of the body 2 lines; of the wings 4 lines.

Gen. *CULCUA*, n. g.

Caput parvum; frons declivis. *Antennæ* breves; articulus 3^{us} rotundus; arista apicalis, longa, tenuis, setiformis. *Thorax* productus, longiconicus. *Scutellum* quadrispinosum. *Abdomen* crassum, subrotundum, thorace brevius et latius. *Pedes* breves, simplices. *Alæ* sat angustæ. *Mas*. *Oculi* suprâ connexi.

Head small; front vertical. Antennæ short; 3rd joint round; arista long, slender, setiform; apical. Thorax elongate-conical, produced in front. Scutellum with 4 spines. Abdomen thick, nearly round, shorter and broader than the thorax. Legs short, slender, unarmed. Wings rather narrow; structure of the veins like that of *Clitellaria*.

Male. Eyes connected above.

24. *CULCUA SIMULANS*, n. s., mas. Nigra, capite albo-tomentoso, antennis fulvis, thorace et abdomine fasciis cinereo-pubescentibus, scutelli spinis fulvis, alis subcinereis fasciâ mediâ nonnunquam subinterruptâ apiceque latè nigricantibus.

Male. Black. Head with white tomentum. Antennæ tawny. Thorax and abdomen with bands of grey down. Scutellum with tawny spines. Legs pubescent. Wings slightly greyish, blackish towards the tips, and with a sometimes nearly interrupted blackish band. Length of the body 3-3½ lines; of the wings 5-6 lines.

This species also inhabits Malacca, and was accidentally omitted in the descriptions of the Malay species.

Gen. *EVAZA*, n. g.

Corpus planum, subglabrum. *Caput* thoracis latitudine. *Antennæ* breves; articulus 1^{us} longiusculus; 3^{us} rotundus; arista apicalis, longa, gracilis, setiformis. *Thorax* ellipticus. *Scutellum* quadri-spinosum. *Abdomen* subellipticum, thorace paulò longius, vix latius. *Pedes* graciles, simplices. *Alæ* sat longæ, vix latæ. *Mas*. *Oculi* magni, suprâ connexi.

Body rather flat, nearly bare. Head as broad as the thorax. Antennæ short; 1st joint rather long; 3rd round; arista long, slender, setiform, apical. Thorax elliptical. Scutellum with 4 rather long spines. Abdomen flat, elliptical, a little longer but hardly broader than the thorax. Legs slender, unarmed. Wings rather long, moderately broad; structure of the veins like that of *Clitellaria*.

Male. Eyes large, connected above.

25. *EVAZA BIPARS*, n. s., mas. Nigra nitida, oculis rufis, antennis scutelli margine postico spinisque pedibus halteribusque pallidè flavescentibus, abdominis disco flavescente, alis cinereis stigmatè venisque nigricantibus.

Male. Black, shining. Eyes red. Antennæ, hind border and spines of the scutellum, legs and halteres pale yellow. Arista black. Thorax with a testaceous line on each side. Disk of the abdomen yellowish. Wings grey; stigma and veins blackish, the latter testaceous at the base. Length of the body 3 lines; of the wings 6 lines.

Gen. *SARGUS*, *Fabr.*

26. *Sargus metallinus*, *Fabr. Syst. Anth.* 258. 11.

Inhabits also Hindostan and Java.

27. *Sargus luridus*, *Walk.* See page 8.

28. *SARGUS LATIFASCIA*, n. s., mas. Fulvus, antennis pectore abdomine pedibusque testaceis, abdomine fasciis latis nigris, pedum posteriorum femoribus nigro vittatis, tibiis tarsisque nigris, his albido fasciatis, alis cinereis venis nigris basi fulvis.

Male. Tawny. Antennæ, pectus, abdomen and legs testaceous. Abdomen with broad black bands. Hind femora striped with black; hind tibiæ and hind tarsi black, the latter with a whitish band. Wings grey; veins black, tawny at the base. Length of the body 5 lines; of the wings 11 lines.

Fam. *TABANIDÆ*, *Leach.*

Gen. *TABANUS*, *Linn.*

29. *Tabanus hybridus*, *Wied. Auss. Zweigl.* i. 557. 31.

Inhabits also Macao.

30. *Tabanus univentris*, *Walk.* See page 9.

Var. Abdomen luteous-tawny, with an indistinct paler dorsal stripe.

31. *TABANUS NEXUS*, n. s., fœm. Ferrugineus subtùs canescens, callo piceo clongato, antennis nigris, thorace vittis subobsoletis rufescentibus, abdomine rufescente c maculis trigonis testaceis univittato, pedibus rufescentibus, femoribus anticis tibiis anticis apice tarsisque nigris, alis cinereis venis fusco marginatis, halteribus pallidè luteis.

Female. Very nearly allied to *T. univentris*. Ferruginous, somewhat hoary beneath. Callus piceous, long and slender. Proboscis black. Lancets ferruginous. Palpi brown. Antennæ black; angle of the 3rd joint small. Thorax with indistinct reddish stripes. Abdomen reddish, with a testaceous triangular spot on the hind border of each segment. Legs reddish; fore femora, tips of the fore tibiæ and tarsi black. Wings grey; veins black, clouded with brown. Halteres pale luteous. Length of the body 8 lines; of the wings 16 lines.

32. *TABANUS FUMIFER*, n. s., mas et fœm. Fuscus subtùs cinereus, abdomine ferrugineo-rufo apicem versus nigro segmentorum marginibus posticis testaceis, pedibus nigris, tibiis ferrugineo vittatis, alis fuscis. Mas. An-

tennis ferrugineis, alarum margine postico cinereo. *Fem.* Antennis nigris, basi ferrugineis, abdomine maculis dorsalibus subtrigonis testaceis, alarum areolis cinereo vittatis.

Male and Female. Very nearly allied to *T. univentrus*. Brown, cinereous beneath. Abdomen ferruginous-red, black towards the tip; hind borders of the segments testaceous. Legs black; tibiæ with ferruginous stripes. Wings brown; veins black. Halteres pale luteous. *Male.* Eyes æneous, and with very small facets in front. Antennæ ferruginous. Wings grey along the hind border, and with indistinct grey streaks on the areolets elsewhere. *Female.* Antennæ black, ferruginous at the base. Abdomen with a small nearly triangular spot on the hind border of each segment. Areolets of the wings with cinereous disks. Length of the body 6-7 lines; of the wings 12-14 lines.

33. *TABANUS OPTATUS*, n. s., *fem.* Ferrugineus subtilis canus, capite antico albido callo lanceolato, antennis nigris basi fulvis, thoracis lateribus testaceis, scutello cano, abdomine fulvo vittâ posticâ dilatatâ nigrâ guttis dorsalibus albidis, pedibus nigris, tibiis anticis basi tibiisque posterioribus fulvis, alis nigro-fuscis apice lato margineque postico subcinereis maculâ mediâ sublimpidâ.

Female. Ferruginous, hoary beneath. Head whitish in front. Callus lanceolate. Proboscis black. Palpi testaceous. Antennæ black, tawny at the base; angle of the third joint acute, slightly elongated. Thorax with three darker lines; sides testaceous. Scutellum hoary. Abdomen tawny; hind borders of the segments beneath and on each side above testaceous; a black dorsal stripe which is dilated hindward; a whitish nearly triangular dot on the hind border of each segment. Legs black; fore tibiæ at the base and hinder tibiæ tawny. Wings blackish-brown; apical third part and hind border slightly cinereous; a nearly limpid discal spot before the middle; veins black. Halteres blackish. Length of the body 6 lines; of the wings 12 lines.

34. *TABANUS SIMPLICISSIMUS*, n. s., *mas et fem.* Cinereus, callo trigonopiceo, antennis fulvis, thoracis lateribus testaceis, abdomine testaceo apice nigricante, pedibus nigris. *Mas.* Tarsis posterioribus basi tibiisque posterioribus testaceis, tibiis anticis testaceis apice nigris, alis sublimpidis costâ venisque testaceis. *Fem.* Femoribus apice fulvis, tibiis albidis, anticis apice nigris, tarsis posterioribus basi fulvis, alis cinereis apud costam luridis venis nigris basi ferrugineis.

Male and Female. Cinereous. Callus at the base of the antennæ broad, triangular, piecous. Palpi testaceous. Antennæ tawny; 3rd joint not dilated nor dentate. Sides of the thorax testaceous. Abdomen testaceous, blackish at the tip. Legs black.

Male. Eyes in front æneous, and with very minute facets. Tibiæ testaceous; fore tibiæ with black tips; hinder tarsi testaceous at the base. Wings nearly limpid, very slightly cinereous; costa, veins and halteres testaceous.

Female. Callus between the eyes long and slender. Femora with tawny tips; tibiæ whitish; fore tibiæ with black tips; hinder tarsi tawny towards the base. Wings cinereous, lurid along the costa; veins black, ferruginous towards the base. Length of the body $3\frac{1}{2}$ - $4\frac{1}{2}$ lines; of the wings 7-8 lines.

Gen. CHRYSOPS.

35. *Chrysops dispar*, *Fabr.* See p. 9. "Very abundant in the jungle at Sarawak."

36. *Chrysops fasciatus*, *Wied. Auss. Zweifl.* i. 198. 5.
Inhabits also Java.

37. *CHRYSOPS FIXISSIMUS*, n. s., fœm. Picca, capite thoracisque marginibus aureo-pubescentibus, capitis callo atro, facie ferrugineâ guttis duabus lateralibus nigris, antennis nigris basi fulvis, abdomine fulvo fasciis tribus nigricantibus, pedibus fulvis, tibiis subdilatis nigricantibus, alis subcinereiscentibus costâ apice fasciâque latâ nigro-fuscis.

Tar. Abdomine bifasciato basi testaceo.

Female. Piceous. Head and borders of the thorax with gilded down. Head with a black shining callus above the antennæ; face ferruginous, shining, with a black dot on each side. Palpi tawny. Antennæ black, tawny at the base. Abdomen tawny, with three blackish bands. Legs tawny; femora and tarsi with piceous tips; tibiæ and fore tarsi black, the former slightly dilated. Wings very slightly cinereous, brown along the costa and at the tips, and with a broad brown band. Halteres testaceous.

Tar. Abdomen testaceous at the base, with two bands, the fore one black, the hind one brown. Length of the body $3\frac{1}{2}$ –4 lines; of the wings 7–8 lines.

Gen. HÆMATOPOTA, *Meig.*

38. *Hæmatopota roralis*, *Fabr. Syst. Antl.* 107. 2.

"Eyes above opal white, with black specks."

39. *HÆMATOPOTA ATOMARIA*, n. s., fœm. Nigro-picca, capite anteo atro nitido, antennis nigris basi nitidis, abdominis marginibus posticis canis, tibiis albido cinctis, alis nigricantibus guttis plurimis annuloque unico albis.

Female. Piceous-black. Head black and shining in front. Palpi ferruginous. Antennæ black; 1st joint shining. Abdominal segments with hoary hind borders. Tibiæ with a whitish band on each. Wings blackish, with very numerous white dots, and with one white ringlet which is by the costa at two-thirds of the length. Length of the body 3 lines; of the wings 6 lines.

Fam. ASILIDÆ, *Leach.*Subfam. DASYPOGONITES, *Walk.*Gen. DASYPOGON, *Fabr.*Subgen. MICROSTYLUM, *Macq.*

40. *Dasypon Vica*, *Walk. Cat. Dipt.* pt. 2. 304.

Inhabits also Silhet.

41. *DASYPOGON INCOMPTUS*, n. s., mas. Nigro-cinereus subtus canescens, facie ferrugineâ, antennis pedibusque nigris, thorace vittis quatuor canis,

abdomine maculis lateralibus canis apice rufescente, alis violacco-nigricantibus.

Male. Blackish-cinereous, hoary beneath. Face bright ferruginous. Epistoma with six white bristles. Antennæ and legs black. Thorax with four hoary stripes. Abdomen with hoary spots along each side; tip reddish; appendages black, ciliated. Wings blackish, with violet reflections. Length of the body 9 lines; of the wings 16 lines.

Gen. DISCOCEPHALA, *Macquart*.

42. DISCOCEPHALA DORSALIS, *Walk.* (See page 9.) mas. Thorace vittis duabus testaceis, abdomine picco fasciis latis abbreviatis testaceis apice nigro-cupreo, pedibus testaceo-fulvis, femoribus tibiisque apice nigricantibus, femoribus posticis crassis spinosis.

Male. Thorax with two testaceous stripes. Abdomen piceous, with short broad testaceous bands, blackish cupreous towards the tip. Legs testaceous-tawny; femora and tibiæ with blackish tips; hind femora thick, spinose.

Subfam. LAPHRITES, *Walk.*

Gen. LAPHRIA, *Fabr.*

43. Laphria Reinwardtii, *Wied.* See page 10.

44. Laphria alternans, *Wied.* See page 10.

45. Laphria notabilis, *Walk.* See page 10.

46. Laphria triangularis, *Walk. Cat. Dipt.* 2nd Ser. 3. 553. 138.

Inhabits also Sumatra.

47. Laphria constricta, *Walk. Cat. Dipt.* 2nd Ser. 3. 555. 142.

Inhabits also Sumatra.

48. Laphria aurifacies, *Macq.* See page 10.

49. Laphria inaurea, *Walk.* See page 11.

50. Laphria plana, *Walk.* See page 12.

51. LAPHRIA UNIFASCIA, n. s., mas. Nigro-cuprea aureo-hirta, mystace nigro, abdominis lateribus fasciâ ventrequè rufescentibus, alis nigricantibus basi latè sublimpidis venis nigris, halteribus fulvis.

Male. Blackish cupreous, partly clothed with gilded hairs. Face with very pale gilded tomentum. Mystax with some black bristles. Antennæ black; 3rd joint linear, acuminate, a little longer than the 1st and the 2nd together. Thorax with two bands of gilded tomentum. Abdomen reddish beneath and on each side, and with a very broad reddish band. Legs black, stout, pilose; hind femora very thick. Wings blackish, nearly limpid for one-third of the length from the base. Halteres tawny. Length of the body 5 lines; of the wings 8 lines.

52. LAPHRIA COMPTISSIMA, n. s., mas et fœm. Aureo-tomentosa, facie albo-tomentosâ, antennis pedibusque nigris, abdomine apicem versus nigro-purpureo, tibiis luteis, alis nigricantibus dimidio ferè basali subcinereo, halteribus fulvis apice fuscis.

Male and Female. Body covered with gilded tomentum. Mystax composed of several slender black bristles. Antennæ and legs black. Third joint of the antennæ nearly linear, slightly acuminate, hardly longer than the 1st and the 2nd together. Abdomen bare, shining and blackish-purple towards the tip. Legs rather stout; tibiæ luteous; hind tibiæ black towards the tips. Wings blackish, slightly greyish on nearly half the length from the base; veins black, tawny at the base. Halteres tawny, with brown knobs.

Male. Face with white tomentum.

Female. Face with pale gilded tomentum.

Length of the body $4\frac{1}{2}$ –5 lines; of the wings 8–9 lines.

53. *LAPHRIA RUDIS*, n. s., fœm. Nigra, capite postico pectoreque cano-tomentosis, facie fulvâ, thorace vittis duabus canis; abdomine cyaneo-nigro maculis lateralibus canis, alis nigricantibus basi latè subcinereis, halteribus fulvescentibus.

Male. Black. Head with hoary tomentum behind, thickly clothed beneath with testaceous hairs. Face tawny. Mystax composed of many black bristles. Thorax with two hoary stripes. Pectus hoary. Abdomen bluish-black, with hoary spots along each side. Legs stout, clothed with hoary and pale testaceous hairs, and with black bristles. Wings blackish, slightly greyish for more than one-third of the length from the base; veins black. Halteres somewhat tawny. Length of the body 6 lines; of the wings 11 lines.

54. *LAPHRIA PRODUCTA*, n. s., mas. Atra vix pilosa, facie aureo-tomentosâ, pectore cano, abdomine longiusculo punctis lateralibus canis, pedibus crassis, alis nigricantibus dimidio ferè basali subcinereo, halteribus testaceis.

Male. Deep black, hardly pilose. Face with pale gilded tomentum. Mystax with very few black bristles. Pectus with hoary tomentum. Abdomen somewhat long, with minute hoary dots along each side. Legs thick, rather short. Wings blackish, greyish for nearly half the length from the base; veins black. Halteres testaceous. Length of the body $4\frac{1}{2}$ lines; of the wings 7 lines.

55. *LAPHRIA LEPIDA*, n. s., mas. Nigra aureo-pilosa, facie aureo-tomentosâ, thorace bivittato et bifasciato, abdomine aureo-rufo, pedibus crassis pilosis, alis nigricantibus triente basali subcinereo, halteribus testaceis.

Male. Black, clothed with gilded hairs. Face with gilded tomentum. Mystax with many gilded and with a few black bristles. Third joint of the antennæ linear, conical at the tip, longer than the 1st and the 2nd together. Thorax with two stripes and two bands of gilded tomentum. Pectus gilded. Abdomen with golden-red tomentum. Legs pilose; femora incrassated. Wings blackish, slightly cinereous for full one-third of the length from the base; veins black. Halteres testaceous. Length of the body 6 lines; of the wings 11 lines.

56. *LAPHRIA COMPLETA*, n. s., fœm. Nigra fulvo-pilosa, facie pectoreque aureo-tomentosis, abdominis apice glabro nigro-purpureo, pedibus robustis, alis fuscis triente basali pallidiore, halteribus testaceis.

Female. Black, clothed with tawny hairs. Face and pectus with gilded tomentum. Mystax with several gilded and with a few black bristles. Third joint of the antennæ elongate-fusiform, longer than the 1st and the 2nd together. Legs hairy; femora slightly thickened. Wings brown, paler towards the base; veins black. Halteres testaceous. Length of the body 6 lines; of the wings 12 lines.

57. *LAPHRIA INCIVILIS*, n. s., fœm. Nigra fulvo-tomentosa, facie subauratâ, pectore cano, abdominis lateribus cano-guttatis, tibiis basi fulvis, alis fusco-cinereis basi pallidioribus, halteribus testaceis.

Female. Black, thinly covered with tawny tomentum, not pilose. Face with slightly gilded tomentum. Mystax with very few black bristles. Pectus hoary. Hind borders of the abdominal segments with a hoary dot on each side. Legs slightly pilose; femora rather stout; tibiæ tawny, black towards the tips. Wings brownish-grey, paler at the base; veins black. Halteres testaceous. Length of the body $4\frac{1}{2}$ lines; of the wings 8 lines.

58. *LAPHRIA PARTITA*, n. s., fœm. Nigra, facie albido-tomentosâ, thorace fusco-tomentosâ, pectore cano, abdomine nigro-purpureo, pedibus fulvis, tarsis tibiis apice genubusque posticis nigris, alis subfuscis aut subcinereis, halteribus testaceis.

Female. Black. Face with whitish tomentum, which is very slightly gilded. Mystax with several bristles of the same hue. Third joint of the antennæ fusiform, as long as the 1st and 2nd together. Thorax thinly covered with brownish tomentum. Pectus hoary. Abdomen purplish-black, with a very slight cupreous tinge; sides with brownish tomentum. Legs tawny; femora moderately stout; coxæ, trochanters, tarsi, tips of the tibiæ and hind knees black. Wings slightly cinereous or with a brownish tinge; veins black. Halteres testaceous. Length of the body 4 lines; of the wings 8 lines.

59. *LAPHRIA INTERRUPTA*, n. s., fœm. Nigra, facie aureo-tomentosâ, thoracis fasciis duabus interruptis pectoreque subaurato-tomentosis, abdomine nigro-aureo maculis tribus lateralibus fulvis, tibiis tarsisque testaceis apice nigris, alis nigricantibus dimidio basali subcinereo, halteribus testaceis.

Female. Black. Face with gilded tomentum. Mystax with a few gilded and very few black bristles. Thorax with two interrupted bands of very pale gilded tomentum, which also covers the pectus. Abdomen blackish-aeneous, with three tawny tomentose spots on each side. Femora moderately thick; tibiæ and tarsi testaceous, black towards the tips. Wings blackish, very slightly greyish for half the length from the base; veins black. Halteres testaceous. Length of the body 4 lines; of the wings 8 lines.

60. *LAPHRIA CINGULIFERA*, n. s., fœm. Nigra, capite pectore thoracisque fasciis duabus interruptis pallidè aureo-tomentosis, abdominis segmentis apud margines posticos aurato-tomentosis, pedibus testaceis, femoribus nigro-vittatis, tibiis posticis apice tarsisque anticis nigris, tarsis posterioribus nigro-cinctis, alis cinereis, halteribus testaceis.

Female. Black. Head and pectus with very pale gilded tomentum. Thorax with two stripes and two interrupted bands of the same hue. Mystax with many pale gilded bristles. Third joint of the antennæ linear, slightly acuminate, very much longer than the 1st and the 2nd together. Ab-

domen with a gilded band on the hind border of each segment. Legs testaceous; femora hardly stout, with black stripes; hind trochanters and fore tarsi black; hind tibiae with black tips; posterior tarsi with black bands. Wings cinereous; veins black. Halteres testaceous. Length of the body 6 lines; of the wings 11 lines.

61. *LAPHRIA DETECTA*, n. s., mas. Atrâ, capite postico pectoreque albido-tomentosis, thorace maculâ laterali pallidè aureo-tomentosâ, abdomine basi albo piloso maculis lateralibus aurato-tomentosis, pedibus fulvis, femoribus nigro-vittatis, tarsis nigris basi fulvis, alis limpidis dimidio ferè apicali nigricante.

Male. Deep black. Head behind and pectus with whitish tomentum. Mystax with very few black bristles. Third joint of the antennæ nearly linear, elongate-conical towards the tip, very much longer than the 1st and the 2nd together. Thorax with a spot of pale gilded tomentum on each side, in front of the base of the wing. Abdomen with white hairs at the base, and with three spots of gilded tomentum on each side. Legs tawny; coxæ and trochanters black; femora rather thick, with black stripes, which are very short on the hind pair; tarsi black, tawny at the base. Wings limpid, blackish for nearly half the length from the tips; veins black, tawny in the limpid part. Halteres very pale yellow. Length of the body $6\frac{1}{2}$ lines; of the wings 11 lines.

Subfam. ASILITES, *Walk.*

Gen. TRUPANEA, *Macq.*

62. *Trupanea Amorges*, *Walk. Cat. Dipt.* pt. 2. 391 (*Asilus*); 2nd ser. pt. 3. 612. 102.

63. *TRUPANEA INSERENS*, n. s., mas et fem. Nigra, fusco-tomentosa, facie pectoreque subauratis, mystace suprâ albido subtùs nigro, antennis pedibusque nigris, thorace vittis quinque nigris, abdominis segmentis cano interruptè marginatis, alis fuscis.

Male and Female. Black, with brown tomentum. Face and pectus with pale, slightly gilded tomentum. Mystax with some whitish bristles above, and with very few black bristles beneath. Antennæ black; arista as long as the 3rd joint. Thorax with five black stripes. Abdomen rather slender, moderately long; hind borders of the segments with slightly interrupted hoary bands. Legs black; tibiae ferruginous above, except towards the tips. Wings brown; veins black; 3rd externo-medial vein joining the 4th far from the base. Halteres tawny.

Male. Sexualia moderately large. *Female*. Abdomen attenuated, not stylate. Length of the body 6 lines; of the wings 9–10 lines.

Gen. ASILUS, *Linn.*

64. *Asilus Barium*, *Walk.* See p. 14.

65. *ASILUS FLAGRANS*, n. s., fem. Piceus, capite pectoreque aureo-tomentosis, mystace aureo, antennis fulvis, thorace strigis duabus obliquis lateralibus vittisque duabus aureo-tomentosis, abdominis segmentis testaceo-

marginatis, pedibus fulvis, tibiis posticis femoribusque picco-vittatis, tarsis posticis nigris, alis luridis triente apicali fusca.

Female. Piccous. Head and pectus with gilded tomentum. Mystax with several gilded bristles. Antennæ tawny; arista as long as the preceding joints together. Thorax with two oblique streaks on each side, and with two stripes of gilded tomentum. Abdomen moderately long, hardly stylate; hind borders of the segments testaceous. Legs tawny; femora and hind tibiæ mostly piccous above; hind tarsi black. Wings lurid; apical third part brown, which colour extends further along the hind border; veins black, tawny at the base; cubital vein forked at a little beyond half its length; hind fork very undulating; 3rd externo-medial vein joining the 4th at some distance from the border. Halteres tawny. Length of the body $5\frac{1}{2}$ lines; of the wings 12 lines.

66. *ASILUS CONTORTUS*, n. s., fœm. Niger, cinereo-tomentosus, facie albidâ, mystace supra nigro subtus albidâ, antennis nigris, thorace vittis duabus nigricantibus, pectore cano, abdomine subaureo piloso segmentis testaceo-marginatis, pedibus ferrugineis, femoribus tibiisque apice tarsisque nigris, alis luridis areolarum apicalium fuscæ discis pallidioribus.

Female. Black, with cinereous tomentum. Face prominent, whitish. Mystax with some black bristles above, and with many whitish bristles beneath. Antennæ black; arista as long as the preceding joints together. Thorax with two indistinct blackish stripes. Pectus hoary. Abdomen with slightly gilded hairs, moderately long, hardly stylate; hind borders of the segments testaceous; tip black, shining. Legs ferruginous; tarsi and tips of the femora and of the tibiæ black. Wings lurid; apical areolets brown, with pale disks; veins black; cubital vein forked at beyond half its length; fore fork angular near its base; hind fork very undulating; 3rd externo-medial vein joining the 4th near the border. Halteres tawny. Length of the body 6 lines; of the wings 13 lines.

GEN. OMMATIUS, *Illiger*.

67. *Ommatius Hecale*, *Walk.* See p. 14.

GEN. LEPTOGASTER, *Meigen*.

68. *LEPTOGASTER TRICOLOR*, n. s., mas. Piccus, capite albidâ-tomentoso, thoracis vittis duabus posticè attenuatis pectorisque lateribus testaceis, abdomine nigro fasciis quinque flavis, pedibus flavis, tibiis posticis tarsisque apice nigris, tarsis posticis ferrugineis apice nigris, alis cinereis costâ luridâ, halteribus testaceis.

Male. Piccous. Head with whitish tomentum. Antennæ testaceous towards the base. Thorax with two stripes, which are attenuated hindward, and with the sides of the pectus testaceous. Abdomen black, with five yellow bands. Legs yellow; coxæ and knees black; hind femora striped with black beneath; hind tibiæ with black tips; hind tarsi ferruginous, with black tips. Wings grey, lurid along the costa; veins black. Halteres testaceous. Length of the body 7 lines; of the wings 11 lines.

69. *LEPTOGASTER INUTILIS*, n. s., mas. Niger nitens, pectore cano, pedibus testaceis, femoribus tibiis et tarsorum articulis apice nigris, femoribus

posticis apices versus nigricantibus annulo subapicali testaceo, alis limpida venis nigris triente basali infuscatis, halteribus testaceis apice fuscis.

Male. Black, shining. Pectus with hoary tomentum. Legs testaceous; tips of the femora, of the tibiæ, and of the joints of the tarsi black; hind femora mostly blackish, with a testaceous subapical band. Wings limpid; veins black, clouded with brown towards the base. Halteres testaceous, with brown knobs. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

Fam. LEPTIDÆ, *Westw.*

Gen. LEPTIS, *Fabr.*

70. *Leptis ferruginosa*, *Wied. Auss. Zweifl.* i. 224. 6.

71. *Leptis decisa*, *Walk.* See p. 15.

Gen. CHRYSOPILA, *Macq.*

72. *CHRYSOPILA MACULIPENNIS*, n. s., mas et fœm. Picea, pectore testaceo cano-tomentoso, abdominis segmentis testaceo-fasciatis, pedibus testaceis, alis limpida, fasciis tribus maculosis fuscis.

Male and Female. Piceous. Head in front and pectus with hoary tomentum. Proboscis, legs and halteres testaceous. Antennæ black. Abdomen with a testaceous band on the hind border of each segment. Wings limpid, with three irregular brown bands; 2nd and 3rd bands broad, connected, adorned with several limpid spots; veins black. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

Fam. BOMBYLIDÆ, *Leach.*

Subfam. THEREVITES, *Walk.*

Gen. THEREVA, *Latr.*

73. *THEREVA PRÆCEDENS*, n. s., fœm. Nigra confertim cano-tomentosa, capite antico albo barbâque albâ, pedibus subpilosis, alis subcinereis venis nigris.

Female. Black, entirely covered with hoary tomentum. Head white and shining in front, clothed beneath with white hairs. Proboscis black and shining as usual. Legs slightly hairy. Wings slightly greyish; veins black. Length of the body $3\frac{1}{2}$ lines; of the wings 5 lines.

Subfam. BOMBYLITES, *Walk.*

Gen. ANTHRAX, *Fabr.*

74. *Anthrax Tantalus*, *Fabr. Syst. Anth.* 124. 29.

Inhabits also Hindostan, Java and China.

75. *Anthrax pennipes*, *Wied. Auss. Zweifl.* i. 272. 23.

Inhabits also Java.

76. *ANTHRAX SEMISCITA*, n. s. (Group 10. *Dipt. Saund.* 167), mas. Nigropicea cinereo nigroque pilosa, abdomine nigro apicem versus argenteo-

micante, alis nigricantibus dimidio apicali obliquè limpido guttis duabus (unâ anteriore exteriore, alterâ posteriore interiore) nigricantibus.

Very nearly allied to *A. himacula*, Walk. *Male*. Blackish-piceous, with a few grey and black hairs. Abdomen black, brilliant silvery towards the tip. Wings obliquely blackish for half the length from the base, the blackish part very irregular in outline, and extending to $\frac{3}{4}$ ths of the length of the costa; one blackish dot on the basal angle of the fore fork of the cubital vein, the other on the hind end of the veinlet between the 2nd and 3rd externo-medial veins; veins black. Halteres with whitish tips. Length of the body 4 lines; of the wings 11 lines.

77. ANTHRAX SATELLITIA, n. s. (Group 10. *Dipt. Saund.* 167), mas. Atra vix pilosa, alis nigricantibus plus triente apicali subobliquè limpidâ guttis tribus discalibus unâque apicali nigricantibus.

Male. Deep black, hardly pilose. Wings blackish, obliquely limpid for more than one-third of the length from the tips; the outline of the blackish part slightly denticulate; the limpid part containing four blackish dots, three discal and one apical, the middle discal dot much larger than the two others. Length of the body 3 lines; of the wings 8 lines.

Fam. DOLICHOPIDÆ, Leach.

Gen. PSILOPUS, Meigen.

78. *Psilopus apicalis*, Wied. *Auss. Zweifl.* ii. 227. 32.
Inhabits also Sumatra.

79. *Psilopus robustus*, Walk. See page 16.

80. *Psilopus tenebrosus*, Walk. See page 16.

81. PSILOPUS ALLECTANS, n. s., mas. Lætè cyaneo-viridis, antennarum articulo 3^o fulvo, aristâ longissimâ apice albidâ, abdominis segmentis atro-fasciatis, pedibus testaceis, tarsis nigricantibus, alis obscurè fuscis posticè pallidioribus, venis halteribusque nigris.

Male. Bright bluish-green. Proboscis testaceous. Third joint of the antennæ tawny; arista longer than the body, whitish at the tip. Abdomen with deep black bands. Legs testaceous; tarsi blackish, paler towards the base. Wings dark brown, paler along the hind border; veins and halteres black; fore branch of the præbrachial vein nearly straight; discal transverse vein curved outward. Length of the body 3 lines; of the wings 5 lines.

82. PSILOPUS ALLICIENS, n. s., mas. Lætè cyaneo-viridis, facie pectoreque argenteo-tomentosis, antennis testaceis, articulo 3^o lanceolato, aristâ vix longâ, abdominis segmentis atro-fasciatis, pedibus testaceis, alis sublimpidis, venis halteribusque testaceis.

Male. Bright bluish-green. Face and pectus with silvery tomentum. Proboscis testaceous. Antennæ testaceous; 3rd joint lanceolate; arista black, less than half the length of the body. Abdomen with broad deep black bands, partly æneous towards the tip. Legs testaceous; tarsi darker towards the tips. Wings nearly limpid; veins and halteres testaceous; fore branch of the præbrachial vein much curved; discal transverse vein undulating. Length of the body 3½ lines; of the wings 6 lines.

83. *PSILOPUS ILLICIENS*, n. s., mas. Lætè cyaneo-viridis, antennis nigris articulo 3^o brevi, aristâ sat longâ, abdomine lætè viridi segmentis atrofasciatis, pedibus nigris, tibiis fulvescentibus, alis cinereis apud costam fusciscentibus, venis halteribusque nigris.

Male. Bright bluish-green. Proboscis black. Antennæ black; 3rd joint short; arista more than half the length of the body. Abdomen emerald-green, with broad black bands. Legs black; tibiæ dull tawny. Wings grey, brownish along the costa; veins and halteres black; fore branch of the præbrachial vein curved; discal transverse vein undulating. Length of the body 3 lines; of the wings 6 lines.

84. *PSILOPUS DELECTANS*, n. s., mas. Lætè cyaneo-viridis, facie pectoreque argenteo-tomentosis, antennis nigris articulo 3^o conico, aristâ sat longâ, abdomine lætè viridi segmentis nigro-fasciatis, pedibus nigris, alis subcinereis, venis halteribusque nigris.

Male. Bright bluish-green. Face and pectus with silvery tomentum. Proboscis black. Antennæ black; 3rd joint conical; arista black, more than half the length of the body. Abdomen bright green, with narrow black bands. Legs black. Wings greyish; veins and halteres black; fore branch of the præbrachial vein curved; discal transverse vein undulating. Length of the body 3½ lines; of the wings 6 lines.

85. *PSILOPUS PROLICIENS*, n. s., fœm. Lætè viridis robustus, capite cyaneo-viridi, facie pectore abdominisque lateribus argenteo-tomentosis, antennis nigris articulo 3^o longi-conico, aristâ sat longâ, abdominis segmentis atrofasciatis, pedibus nigris, alis cinereis maculâ costali fuscâ venis nigris, halteribus fulvis.

Female. Bright green, stout. Head bluish-green; face with silvery tomentum. Proboscis black. Antennæ black; 3rd joint elongate-conical; arista full half the length of the body. Thorax with three bright cupreous stripes. Pectus and sides of the abdomen with silvery tomentum. Abdomen with broad deep black bands. Legs black. Wings grey, with an elongated brown spot towards the middle of the costa; veins black; fore branch of the præbrachial vein much curved; discal transverse vein nearly straight. Halteres tawny. Length of the body 2½ lines; of the wings 5 lines.

86. *PSILOPUS PROLECTANS*, n. s., fœm. Lætè cyaneo-viridis, antennis nigris articulo 3^o conico, aristâ longissimâ, abdomine apicem versus purpureo, pedibus nigris, alis obscure fuscis fasciis tribus abbreviatis apiceque sublimpidis, venis halteribusque nigris.

Female. Bright bluish-green. Proboscis black. Antennæ black; 3rd joint conical; arista nearly as long as the body. Abdomen purple towards the tip. Legs black. Wings dark brown, with three nearly limpid bands which do not extend to the costa; 1st band dilated along the hind border to the base of the wing; 2nd very short; 3rd much longer; tips nearly limpid; veins and halteres black; fore branch of the præbrachial vein very much curved; discal transverse vein very deeply undulating, angular, and emitting a short stump in the middle. Length of the body 3 lines; of the wings 6 lines.

87. *PSILOPUS COLLUCENS*, n. s., fœm. Lætè viridi-cyaneus brevis latus, vertice purpureo, facie pectoreque albido-tomentosis, antennis nigris articulo

3° longi-eonico, aristâ vix longâ, abdomine lætè viridi segmentis cupreo-fasciatis, pedibus nigris, tibiis testaceis, alis subcinereis, venis nigris, halteribus testaceis.

Female. Bright greenish-blue, short, broad. Vertex purple. Face and pectus with whitish tomentum. Proboscis black. Antennæ black; 3rd joint elongate-conical; arista about half the length of the body. Abdomen bright green, with cupreous bands. Legs black; tibiæ testaceous. Wings greyish; veins black; fore branch of the præbrachial vein very much curved; discal transverse vein almost straight. Halteres testaceous. Length of the body $1\frac{1}{2}$ line; of the wings 3 lines.

88. *PSILOPUS DERELICTUS*, n. s., mas. Lætè cyaneo-viridis gracilis, metathorace purpureo, abdomine lætè viridi segmentis cupreo-fasciatis, pedibus pallidè flavis, alis sublimpidis venis nigris, halteribus testaceis.

Male. Bright bluish-green, slender. Head wanting. Metathorax purple. Abdomen bright green, with cupreous bands. Legs pale yellow. Wings nearly limpid; veins black; fore branch of the præbrachial vein almost rectangular; discal transverse vein straight. Halteres testaceous. Length of the body $1\frac{3}{4}$ line; of the wings 3 lines.

Gen. *DOLICHOPUS*, Latr.

89. *DOLICHOPUS ELECTUS*, n. s., fem. Lætè viridis robustus, capite antico albo, antennis pedibusque nigris, thoracis margine æneo, abdomine æneo-viridi maculis lateralibus albo-tomentosis, tibiis spinosissimis obscurè testaceis apice nigris, alis fusco-cinereis venis nigris, halteribus fulvis.

Female. Bright green, stout. Head white in front. Antennæ black; arista rather stout. Thorax æneous in front and on each side. Abdomen dark æneous-green, with spots of white tomentum along each side. Legs black; tibiæ dull testaceous with black tips, very spinose. Wings brownish-grey; veins black; præbrachial vein forming a very obtuse angle, nearly straight from thence to its tip; discal transverse vein straight, upright. Halteres tawny. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

90. *DOLICHOPUS ALLIGATUS*, n. s., mas. Æneo-viridis sat gracilis, capite argenteo, antennis nigris, pectore cano, abdomine obscurè æneo, pedibus fulvis, tibiis subspinosis, tarsis nigricantibus basi fulvis, femoribus posterioribus nigris, mediis apice fulvis, alis fuscis sat latis venis nigris, halteribus fulvis.

Male. Æneous-green, rather slender. Head with silvery-white tomentum. Antennæ black. Pectus hoary. Abdomen dark æneous. Legs tawny; tibiæ slightly spinose; tarsi blackish, tawny at the base; posterior femora black; middle femora with tawny tips. Wings brown, rather broad, darker along the apical half of the costa; veins black; præbrachial vein and discal transverse vein straight. Halteres tawny. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

91. *DOLICHOPUS COLLECTUS*, n. s., mas. Lætè viridi-cyanæus gracilis, facie perangustâ, antennis nigris, abdomine cyaneo-purpureo, pedibus testaceis, tibiis vix spinosis, femoribus posticis nigris, tibiis posticis nigricantibus apice testaceis, alis subcinereis latiusculis apud costam fusciscentibus, halteribus testaceis.

Male. Bright greenish-blue, slender. Face extremely narrow. Antennæ black. Abdomen dark bluish-purple. Legs testaceous; tibiæ hardly spinose; hind femora black; hind tibiæ blackish, with testaceous tips. Wings greyish, rather broad, brownish along the costa; veins black; præbrachial vein hardly curved, forming an almost imperceptible angle at its junction with the discal transverse vein which is nearly straight. Halteres testaceous. Length of the body $1\frac{3}{4}$ line; of the wings $3\frac{1}{2}$ lines.

Gen. DIAPHORUS, *Meigen*.

92. DIAPHORUS DELEGATUS, n. s., fœm. Viridis albido-tomentosus, antennis nigris, abdomine æneo-viridi basi testaceo, pedibus testaceis, tarsis nigris, tibiis posticis fusciscentibus, alis subeineris venis nigris, halteribus testaceis.

Female. Green, with whitish tomentum. Proboscis and antennæ black. Abdomen æneous-green, testaceous towards the base. Legs testaceous; tarsi black; hind tibiæ brownish. Wings greyish; veins black; præbrachial vein and discal transverse vein almost straight. Halteres testaceous. Length of the body $2\frac{1}{2}$ lines; of the wings 4 lines.

Fam. SYRPHIDÆ, *Leach*.

Gen. CERIA, *Fabr*.

93. Ceria Javana, *Wied*. See page 17.

Gen. ERISTALIS, *Latr*.

94. Eristalis niger, *Wied*. See page 17.

95. Eristalis arvorum, *Fabr. Syst. Antl.* 235. 14.

Inhabits also Java and China.

96. Eristalis Andramon, *Walk. Cat. Dipt.* pt. 3. 627.

Inhabits also Hindostan.

Gen. HELOPHILUS, *Meigen*.

97. Helophilus insignis, *Walk*. See page 17.

Gen. MERODON, *Fabr*.

98. MERODON VARICOLOR, n. s., fœm. Atra, antennis nigris, aristâ testaceâ, thorace postico cinereo, scutello fulvo, abdomine basi fulvo segmentis testaceo-fasciatis, pedibus nigris, alis subeineris apud costam fuscis venis nigris, halteribus testaceis.

Female. Deep black. Head with hoary tomentum in front. Antennæ black; arista testaceous. Thorax cinereous towards the scutellum, which is tawny. Abdomen with testaceous bands; base tawny. Legs black. Wings slightly greyish, mostly dark brown along the costa; veins black. Halteres testaceous. Length of the body 8 lines; of the wings 12 lines.

Gen. XYLOTA, *Meigen*.

99. Xylota conformis, *Walk*. See page 18.

Gen. MILESIA, *Latr.*

100. *Milesia macularis*, *Wied.* See page 18.

101. *Milesia Reinwardtii*, *Wied.* See page 18.

102. MILESIA ZAMIEL, n. s., fœm. Atrâ, abdomine nigro-cupreo fasciis duabus angustis interruptis flavis, femoribus rufis basi nigris, alis luteis posticè subcinereis maculâ magnâ costali subapicali fuscâ, halteribus fulvis.

Female. Deep black. Head shining in front. Proboscis and antennæ black. Abdomen blackish cupreous, shining, with two slender interrupted yellow bands. Legs black; femora red, black at the base. Wings luteous, greyish along the hind border, with a large brown costal subapical spot; veins luteous, brown towards the tips. Halteres tawny. Length of the body 8 lines; of the wings 16 lines.

Gen. VOLUCELLA, *Geoff.*

103. *Volucella trifasciata*, *Wied. Auss. Zweifl.* ii. 196. 3.

Inhabits also Java.

Gen. BARYTEROCERA, n. g.

Fœm. Corpus sublineare, compactum. Caput thorace paullo latius; facies plana. Antennæ conspicuæ; articuli 1^{us} et 2^{us} brevissimi; 3^{us} longissimus, dilatatus, subarcuatus; arista nuda, basalis, articulo 3^o non longior. Abdomen subovatum, arcuatum, sessile, thorace paullo brevius et latius. Pedes validi, breviusculi. Alæ breviusculæ; venæ transversæ exteriores rectæ non obliquæ.

Female. Body compact, nearly linear. Head a little broader than the thorax; face flat; epistoma slightly prominent. Proboscis extending a little beyond the epistoma. Antennæ diverging; 1st and 2nd joints very short; 3rd very long, dilated, curved and slightly widened towards the tip; arista bare, seated on the base of the 3rd joint, which it does not exceed in length. Abdomen sessile, arched, nearly oval, a little broader and shorter than the thorax. Legs stout, simple, rather short. Wings somewhat short; exterior transverse veins straight, upright, forming almost right angles with the cubital, præbrachial and externo-medial veins.

104. BARYTEROCERA INCLUSA, n. s., fœm. Nigro-cuprea, capite antico albedo, antennis nigris articulo 3^o subtus luteo, thorace pectoreque testaceo bivittatis, abdomine fasciis tribus testaceis, 1^a basali biguttatâ, 2^a interruptâ, 3^a apicali latissimâ trimaculatâ, pedibus testaceis, femoribus posticis apice tibiisque posticis nigris, alis subcinereis maculâ costali fasciâque exteriore pallidiore fuscis.

Female. Blackish cupreous, shining. Head whitish in front. Antennæ black; 3rd joint luteous beneath. Thorax with a testaceous stripe on each side. Pectus with a testaceous streak on each side. Abdomen with three testaceous bands; 1st basal, entire, dilated on each side, including a blackish-cupreous dot on each side; 2nd interrupted, dilated on each side and connected with the 3rd, which is apical, very broad, and includes three very large blackish cupreous spots. Legs testaceous; hind femora towards the tips and hind tibiæ black. Wings greyish, with a dark brown spot

beyond the middle of the costa, and with a paler incomplete exterior band ; veins black, testaceous at the base. Halteres testaceous. Length of the body 3 lines ; of the wings 5 lines.

Gen. CITIBÆNA, n. g.

Mas. Corpus sublineare, pilosissimum. Caput thorace vix latius ; facies plana. Oculi villosissimi. Antennæ breves ; articuli 1^{us} et 2^{us} transversi ; 3^{us} conicus, longior et paulò latior ; arista nuda, basalis, articulo 3^o duplò longior. Abdomen thorace multò longius. Pedes simplices, sat graciles. Alæ sat angustæ ; vena transversa exterior inter cubitalem et præbrachialem angulata, ramulum emittens.

Male. Allied to *Chrysochlamys*. Body nearly linear, thickly pilose. Head hardly broader than the thorax ; face flat. Proboscis short. Eyes very pubescent. Antennæ short ; 1st and 2nd joints transverse ; 3rd conical, longer and a little broader ; arista bare, seated on the base of the 3rd joint, and about twice its length. Abdomen much longer than the thorax. Legs simple, pubescent, rather slender. Wings rather narrow ; 1st externo-medial vein curved ; transverse vein between it and the præbrachial nearly straight and upright ; transverse vein between the cubital and the præbrachial forming an angle which emits a short stump ; fore side of the angle straight ; hind side curved.

105. CITIBÆNA AURATA, n. s., mas. Cuprea aureo-pubescens, capite aurato, oculis villosis, antennis pedibusque testaceis, thorace bivittato, femoribus basi cupreis, posticis cupreis apice testaceis, alis sublimpidis apice subcinereis, venis halteribusque testaceis.

Male. Cupreous, thickly covered with gilded down. Head with gilded tomentum in front. Antennæ testaceous. Eyes very pubescent. Thorax with two stripes of pale tomentum. Abdomen brighter than the thorax. Legs testaceous ; anterior femora cupreous at the base ; hind femora cupreous, with testaceous tips. Wings nearly limpid, greyish towards the tips ; veins testaceous, black towards the tips. Halteres testaceous. Length of the body 4 lines ; of the wings 7 lines.

Gen. SYRPHUS, *Fabr.*

106. *Syrphus ægrotus*, *Fabr. Syst. Antl.* 243. 48. (*Eristalis*.)

Inhabits also Hindostan, Java, and China ?

107. *Syrphus alternans*, *Macq. Dipt. Exot.* ii. 89. 7.

Inhabits also Hindostan.

108. SYRPHUS DIVERTENS, n. s., fem. Chalybæus æneo-varius, capite antico antennis thoracis vittis duabus scutelloque testaceis, abdomine subluteo fasciis tribus strigis sex obliquis vittaque brevi interruptâ apicali nigris, pedibus halteribusque testaceis, tibiis posticis fuscis, alis limpidis.

Female. Chalybeous, partly aneous. Head in front, antennæ, a stripe on each side of the thorax and scutellum testaceous. Abdomen pale luteous, with three black bands on the hind borders of the segments ; a black basal forked streak ; the two following segments with an oblique black streak on each side, and an apical interrupted black streak. Legs testaceous ; hind

tibiæ brown. Wings limpid, rather long; veins black. Halteres testaceous. Length of the body 4 lines; of the wings 9 lines.

109. *SYRPHUS CYATHIFER*, n. s., fœm. Chalybæo-niger, antennis pedibusque fulvis, abdomine maculis sex subtrigonis duabusque minoribus apicalibus fulvis, alis fusco-cinereis, halteribus fulvis.

Female. Chalybeous-black. Head about the eyes and pectus chalybeous. Antennæ tawny. Abdomen with eight tawny spots; 1st, 2nd and 3rd pair large, nearly triangular; 4th smaller, semicircular. Legs tawny. Wings brownish-grey; veins black. Halteres tawny. Length of the body 3 lines; of the wings 6 lines.

Gen. *BACCHA*, *Fabr.*

110. *Baccha Amphithoë*, *Walk. Cat. Dipt.* pt. 3. 549.

Inhabits also Hindostan.

Gen. *ASCIA*, *Megerle*.

111. *Ascia brachystoma*, *Wied. Auss. Zweigl.* ii. 90. 1.

Inhabits also Hindostan.

Fam. *MUSCIDÆ*, *Latr.*

Subfam. *TACHINIDES*, *Walk.*

Gen. *EURYGASTER*, *Macq.*

112. *EURYGASTER SUBFERRIFERA*, n. s., fœm. Nigra cinereo-tomentosa, capite albo, palpis fulvis, thorace vittis quatuor angustis nigris, abdomine fasciis tribus vittaque angustâ nigris, maculis duabus ventre femoribusque ferrugineis, alis subcinereis.

Female. Black, with cinereous tomentum and long black bristles. Head white in front and about the eyes; frontalia black, nearly linear; facialia without bristles; epistoma not prominent, with a stout bristle on each side. Eyes pubescent. Palpi tawny. Antennæ extending to the epistoma; 3rd joint linear, rounded at the tip, full four times the length of the 2nd; arista slender, very much longer than the 3rd joint. Thorax with four slender incomplete black stripes. Abdomen obconical, hardly longer than the thorax, with three black bands and with a slender black stripe; a large ferruginous spot on each side of the 2nd segment; underside mostly ferruginous. Legs black; femora ferruginous. Wings greyish; veins black; præbrachial vein forming a somewhat rounded but hardly obtuse angle at its flexure, from whence it is nearly straight to its tip; discal transverse vein slightly curved inward near its hind end, parted by less than its length from the border and from the flexure of the præbrachial. Alulæ greyish. Length of the body 3 lines; of the wings 6 lines.

Gen. *MEGISTOGASTER*, *Macq.*

Corpus angustum, cylindricum. *Facies* obliqua. *Facialia* non setosa. *Antennæ* longæ; articulus 3^{us} linearis, 2^o sextuplò longior; arista nuda, gracilis, articulo 3^o paullò longior. *Pedes* longiusculi, setosi. *Alæ* angustæ.

Megistogaster, *Macq. Mém. Soc. Sci. Nat. de Lille*, 1850, 185.

Body narrow, cylindrical, slightly setose. Face slightly retracted and oblique; epistoma not prominent; facialia without bristles. Antennæ very long; 3rd joint nearly linear, six times the length of the 2nd; arista bare, slender, a little longer than the 3rd joint. Legs setose, rather long. Wings narrow; præbrachial vein forming an obtuse angle at its flexure, nearly straight from thence to its tip, joining the costal at somewhat in front of the tip of the wing; discal transverse vein undulating, parted by about half its length from the border and from the flexure of the præbrachial. Type. *Tachina Diabolus*, *Wied.*

113. *Megistogaster Imbrasmus*, *Walk. Capt. Dipt.* pt. 4. 781. (*Tachina*.)

Inhabits also China.

The female has silvery-white tomentum in front of the head.

Subfam. DEXIDES, *Walk.*

Gen. DEXIA, *Meigen*.

114. *DEXIA MUNDA*, n. s., mas. Viridis, capite cano, frontalibus atris, oculis nudis, antennis pedibusque nigris, abdomine nigro albo-tomentoso fasciis duabus latissimis interruptis apiceque testaceis, alis fuscis, halteribus testaceis.

Male. Green, shining. Head with hoary tomentum in front and beneath, and with gilded tomentum along the eyes above; frontalia deep black, widening in front; facialia without bristles; epistoma not prominent. Eyes bare. Proboscis and palpi testaceous. Antennæ black; 3rd joint elongate; arista pubescent. Pectus and sides of the thorax with whitish tomentum. Abdomen black, shining, oblanceolate, about twice the length of the thorax, armed with several very stout spines; segments with whitish reflections, and with two very broad interrupted testaceous bands; tip testaceous. Legs black. Wings brown; veins black; præbrachial vein emitting a branch at its flexure which forms an almost right angle, from whence it is indistinctly undulating to its tip, which joins the costal at somewhat in front of the tip of the wing; discal transverse vein undulating, parted by less than half its length from the border, and by more than half its length from the flexure of the præbrachial. Alulae slightly greyish. Halteres testaceous. Length of the body 6 lines; of the wings 8 lines.

115. *DEXIA EXTENDENS*, n. s. (gen. *Thelaira*, *Desv.*), fœm. Atræ, capite cano-tomentoso, vertice cervino, palpis antennisque ferrugineis, thorace vittis tribus fasciisque testaceo-tomentosis, sentelli apice testaceo, abdomine fasciis duabus latis albido-tomentosis, pedibus piceis, femoribus fulvis, alis nigro-fuscis posticè cinereis, halteribus fulvis.

Female. Deep black. Head with hoary tomentum; vertex with fawn-coloured tomentum; frontalia broad; epistoma, proboscis and palpi ferruginous. Antennæ ferruginous, much shorter than the face; arista plumose. Thorax with three stripes and one hinder band of testaceous tomentum; sentellum testaceous at the tip. Pectus with whitish tomentum. Abdomen with some stout bristles, and with two broad bands of whitish tomentum,

the fore one interrupted. Legs piceous; femora tawny. Wings blackish-brown, dark cinereous along the hind border; veins black, tawny at the base; præbrachial vein emitting a short branch at its flexure which forms a slightly acute angle from whence the vein is curved to its tip, and joins the costal at somewhat in front of the tip of the wing; discal transverse vein undulating, parted by hardly half its length from the border, and by rather less than its length from the flexure of the præbrachial. Alulae cinereous. Halteres tawny. Length of the body $5\frac{1}{2}$ lines; of the wings 12 lines.

Subfam. SARCOPHAGIDES, *Walk.*

Gen. CYNOMYIA, *Desv.*

116. *CYNOMYIA FORTIS*, n. s., mas. Lætè cyaneo-viridis, capite testaceo-tomentoso, frontibus nigris, palpis antennisque ferrugineis, abdomine cyaneo, pedibus nigris, alis fusco-cinereis, halteribus fulvis.

Male. Bright bluish-green, with black bristles. Head with shining testaceous tomentum; frontalia black, widening in front. Proboscis, palpi and antennæ pale ferruginous; 3rd joint of the antennæ very long; arista deeply plumose. Abdomen blue. Legs black, stout, very pilose. Wings brownish-grey, darker along the costa beyond the middle; veins black, ferruginous at the base. Halteres tawny. Length of the body 7 lines; of the wings 12 lines.

Gen. SARCOPHAGA, *Meigen.*

117. *Sarcophaga aliena*, *Walk.* See page 22.

118. *SARCOPHAGA INDICATA*, n. s., mas. Nigra, capite albo-tomentoso, frontibus atris, thoracis vittis quatuor interlineatis pectoreque canis, abdomine apicem versus subferrugineo e maculis excavatis albidis quadrifariam tessellato, alis subcinereis, halteribus fulvis.

Male. Black. Head with shining white tomentum; frontalia deep black, linear, rather broad. Antennæ black. Thorax with four hoary stripes, which are interlined with black. Pectus hoary. Abdomen with a ferruginous tinge, which is most apparent towards the tip, distinctly tessellated with four rows of excavated whitish spots. Wings greyish; veins black; præbrachial forming an acute angle at its flexure, near which it is very much curved inward, and is thence straight to its tip; discal transverse vein slightly undulating, parted by less than its length from the border, and by much less than its length from the flexure of the præbrachial. Alulae grey. Halteres tawny. Length of the body $4\frac{1}{2}$ lines; of the wings 8 lines.

Subfam. MUSCIDES, *Walk.*

Gen. IDIA, *Meigen.*

119. *Idia discolor*, *Fabr. Syst. Antl.* 295. 55. (Musca.)

Inhabits also Java.

120. *IDIA BIVITTATA*, n. s., fœm. Rufa subtùs testacea, capite antico nigro, thorace vittis duabus nigris, abdomine suprâ nigro vittâ brevi anticâ rufâ, pedibus testaceis, tarsis anticis nigris basi albidis, alis fusco-cinereis.

Var. β. Thorace nigro vittis duabus canis, abdominis dorso toto nigro.

Female. Red, testaceous beneath. Head black in front. Antennæ pale red. Thorax with two black stripes. Abdomen above black, with a short red stripe on the anterior part. Legs testaceous; fore tarsi black, whitish towards the base. Wings brownish-grey, darker along the costa towards the base; veins black. Halteres testaceous.

Var. β. Thorax black, with two hoary stripes. Abdomen wholly black above. Length of the body 3 lines; of the wings 5 lines.

Gen. *MUSCA*, *Linn.*

121. *Musca flaviceps*, *Macq.* See page 23.

122. *Musca chalybea*, *Wied. Auss. Zweifl.* ii. 402. 30.
Inhabits also Java.

123. *Musca micans*?, *Fabr. Syst. Anth.* 291. 38 (genus *Silbomyia*, *Macq.*).
Inhabits also Hindostan, Sumatra and Java.

This is certainly the *S. micans* of Macquart, but does not quite agree with the descriptions of Fabricius and of Wiedemann.

124. *Musca trita*, *Walk.* See page 24.

125. *Musca diffidens*, *Walk.* See page 26.

126. *MUSCA EXEMPTA*, n. s. (n. subgen. allied to *Pyrellia*, *Desv.*), fœm. Lætè viridis, palpis antennisque nigris, abdominis disco purpureo, pedibus piccis, alis subcinereis basi fuscis, venis præbrachiali et cubitali conjunctis.

Female. Bright green. Palpi and antennæ black. Disk of the abdomen purple. Legs piceous; femora darker than the tibiæ. Wings slightly greyish, brown at the base and along nearly half the length of the costa; veins black; præbrachial vein curved, not angular, joining the cubital vein near the tip of the latter; discal transverse vein almost straight, parted by less than its length from the border, and by more than its length from the flexure of the præbrachial. Alulæ lurid. Length of the body 2 lines; of the wings 3½ lines.

127. *Musca domestica*, *Linn. Syst. Nat.* ii. 990.

Inhabits also Europe and some parts of Africa, Asia, and America.

Gen. *BENGALIA*, *Dev.*

128. *Bengalia Dioclea*, *Walk. Cat. Dipt.* pt. 4. 869 (*Musca*).

Subfam. *ANTHOMYIDES*, *Walk.*

Gen. *ARICIA*, *Macq.*

129. *Aricia patula*, *Walk.* See page 28.

This may perhaps be a variety of *Anthomyia quadrata*, *Wied. Auss. Zweifl.* ii. 428. 14.

The latter inhabits Java.

130. *ARICIA INAPERTA*, n. s., mas et fœm. Testacca, capite suprâ et thoracis disco nigris, orbitis albis, pedibus testaccis, alis cinereis apud costam obscurioribus venis nigris basi fulvis. *Fœm.* Abdominis disco nigro.

Male and Female. Testaceous. Head above and disk of the thorax black. Abdomen shining. Eyes bordered with white tomentum. Legs testaceous. Wings grey, darker along the costa; veins black, tawny at the base; discal transverse vein undulating, slightly oblique, parted by less than its length from the border, and by much more than its length from the præbrachial transverse vein. *Female.* Disk of the abdomen black. Length of the body 3 lines; of the wings $5\frac{1}{2}$ lines.

Gen. *ANTHOMYIA*, *Meigen*.

131. *ANTHOMYIA ILLOCATA*, n. s., fœm. Albida, capite albo, maculâ verticis subquadratâ nigrâ; thorace fasciâ nigrâ, abdomine e maculis nigris trivittato, alis sublimpidis.

Closely allied to *A. tonitru*, Wied. *Female.* Whitish, with black bristles. Head white. Frontalia with a black subquadrate spot in front. Proboscis and legs black. Thorax with a black band in front of the wings. Abdomen with three rows of black spots; the middle spots lanceolate, the lateral triangular. Wings nearly limpid; veins black, testaceous at the base; discal transverse vein slightly curved and oblique, parted by much less than its length from the border, and by much more than its length from the præbrachial transverse vein. Length of the body $2\frac{1}{2}$ lines; of the wings 4 lines.

Gen. *CÆNOSIA*, *Meigen*.

132. *CÆNOSIA macularis*, *Wied. Auss. Zweifl.* ii. 438. 2.

Inhabits also Hindostan.

133. *CÆNOSIA INSURGENS*, n. s., fœm. Nigra cinereo-tomentosa, orbitis albis, antennis testaccis, abdomine e maculis nigris trivittato, alis limpidis, halteribus pallidis.

Female. Black, with cinereous tomentum. Head white about the eyes. Antennæ dull testaceous. Abdomen with three black spots on each side. Wings limpid; veins black, testaceous at the base; discal transverse vein parted by full its length from the border and by nearly twice its length from the præbrachial transverse vein. Halteres pale. Length of the body 2 lines; of the wings 4 lines.

Subfam. *HELOMYZIDES*, *Fallen*.

Gen. *HELOMYZA*, *Fallen*.

134. *Helomyza orientalis*, *Wied. Auss. Zweifl.* ii. 575. 2. (*Sciomyza*.)

Inhabits also Java.

135. *HELOMYZA FUSCICOSTATA*, n. s., fœm. Fulva, facie orbitisque cano-tomentosis, abdomine nigro basi fulvo, tibiis tarsisque fusciscentibus, alis cinereis apud costam fuscis.

Female. Tawny with black bristles, paler beneath. Head with hoary tomentum about the eyes and in front. Abdomen black, tawny at the base. Tibiæ and tarsi brownish. Wings grey, brown along the costa; veins black,

tawny at the base ; discal transverse vein oblique, hardly undulating, parted by full half its length from the border and by less than twice its length from the præbrachial transverse vein. Halteres testaceous, with darker knobs. Length of the body $3\frac{1}{2}$ lines ; of the wings 7 lines.

136. *HELOMYZA EQUATA*, n. s., fem. Ferruginea, facie cinereo-tomentosâ, antennis fulvis, scutelli apice pectoreque nigricantibus, abdomine nigro, pedibus piceis, alis luridis posticè cinereis.

Female. Ferruginous, with black bristles. Head with cinereous tomentum in front. Antennæ tawny. Scutellum towards the tip and pectus blackish. Abdomen black. Legs piceous. Wings lurid, grey along the hind border ; veins tawny ; discal transverse vein straight, oblique, parted by less than its length from the border, and by much more than twice its length from the præbrachial transverse vein. Halteres testaceous. Length of the body $2\frac{1}{2}$ lines ; of the wings 5 lines.

137. *HELOMYZA LIMBATA*, n. s., fem. Pallidè fulva, thorace abdomineque latè nigro-vittatis, pedibus testaceis, alis cinereis.

Female. Pale tawny, with black bristles, testaceous beneath. Arista black, deeply plumose. Thorax and abdomen with a broad black stripe. Legs testaceous. Wings grey ; veins black, tawny at the base ; discal transverse vein parted by much less than its length from the border, and by more than twice its length from the præbrachial transverse vein. Length of the body 2 lines ; of the wings 4 lines.

138. *HELOMYZA PROPECTA*, n. s., fem. Fulva, orbitis albidis, pedibus testaceis, tarsis obscurioribus, alis luridis posticè cinereis apice fuscis.

Female. Tawny, testaceous beneath. Head whitish about the eyes. Arista black, with long hairs. Legs testaceous ; tarsi darker. Wings lurid, grey along the hind border, brown at the tips and along the adjoining part of the costa ; veins tawny, black in the brown part and along the costa ; discal transverse vein clouded with brown, parted by half its length from the border, and by twice its length from the præbrachial transverse vein. Length of the body $2\frac{1}{2}$ lines ; of the wings 5 lines.

139. *HELOMYZA INVICTA*, n. s., fem. Fulva, abdominis segmentis nigro-fasciatis, pedibus testaceis, alis cinereis dimidio apicali anticè fusco venâ discali transversâ fusco-nebulosâ.

Female. Tawny, testaceous beneath. Arista black, with long hairs. Abdomen with a blackish band on the hind border of each segment. Legs testaceous. Wings grey, brown on half the breadth behind the apical half of the costa ; discal transverse vein clouded with brown, almost straight and upright, parted by its length from the border, and by more than twice its length from the præbrachial transverse vein. Length of the body 2 lines ; of the wings 4 lines.

Gen. *SAPROMYZA*, *Fallen*.

140. *Sapromyza biguttata*, *Macq. Dipt. Exot.*

Inhabits also Java.

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Gen. *GAUZANTIA*, n. g.

Fem. *Carpus** *gracile*, setosum, subcylindricum. Oculi nudi. Antennæ

breves; articulus 3^{us} longè conicus; arista plumosa. *Abdomen* oblan-
ceolatum, thorace angustius, vix longius. *Pedes* non setosi. *Alæ* angustæ,
venis parallelis.

Female. Body slender, bristly, nearly cylindrical. Eyes bare. Antennæ short;
3rd joint elongate-conical; arista deeply plumose. Abdomen oblanceolate,
shining, narrower but very little longer than the thorax. Legs not bristly.
Wings narrow; præbrachial vein parallel to the cubital; discal transverse
vein straight, parted by about its length from the border, and by much more
than twice its length from the præbrachial transverse vein.

141. *GAUZANIA DEVECTA*, n. s., fœm. Nigra obscura, abdomine nitente, pe-
dibus piceis, alis nigricantibus posticè pallidioribus, halteribus albidis.

Female. Black, dull. Abdomen shining. Legs piceous; femora darker than
the tibiæ. Wings blackish, paler along the exterior border; veins black.
Halteres whitish. Length of the body $1\frac{3}{4}$ line; of the wings $3\frac{1}{2}$ lines.

Subfam. LAUXANIDES, *Walk.*

Gen. LAUXANIA, *Latr.*

142. *Lauxania eucera*, *Walk.* See page 29.

Gen. CELYPHUS, *Dalman.*

143. *Celyphus scutatus*, *Wied. Auss. Zweifl.* ii. 601. 2.

Inhabits also Hindostan and the Philippine Islands.

Subfam. ORTALIDES, *Haliday.*

Gen. LAMPROGASTER, *Macq.*

144. *Lamprogaster zonata*, *Walk.* See page 30.

145. *Lamprogaster glabra*, *Walk.* See page 30.

“On decaying timber,” *Wallace MSS.*

146. *LAMPROGASTER BASILUTEA*, n. s., mas. Nigra, capite apud oculos vittis-
que duabus anticis testaceis, antennis piceis, thorace vittis quatuor pallidè
flavis, abdomine fasciis duabus pallidè flavis posticè interruptâ, femoribus
apice rufescentibus, tarsis albis apice nigris, alis cinereis fusco subnebulosis
basi anticè luteis, halteribus testaceis.

Male. Very nearly allied to *L. zonata*, and perhaps the male of that species.
Black, shining. Head testaceous about the eyes, and with two testaceous
stripes in front. Antennæ piceous. Thorax with four pale yellow stripes,
one on each side in front of the wings, and one on each side of the scutum.
Abdomen with two slender pale yellow bands, the hind one interrupted. Fe-
mora reddish at the tips; tarsi white, with black tips. Wings grey, partly
and very slightly clouded with brown, luteous along the basal part of the
costa; veins black, tawny towards the base and along the costa; discal
transverse vein like that of *L. zonata*. Halteres testaceous. Length of
the body 3 lines; of the wings 6 lines.

147. *LAMPROGASTER DIVISA*, n. s., fœm. Nigra, tibiis testaceis nigro-fas-
ciatis, tarsis albis apice nigris, alis nigricantibus guttis plurimis fasciâque
interlineatâ limpidis, halteribus pallidis.

Female. Black. Abdomen shining. Tibiæ testaceous, with black bands; tarsi white, with black tips. Wings blackish, with numerous limpid dots, and with a limpid band which includes the discal transverse vein, and is intersected by an interrupted blackish line. Halteres pale. Length of the body 2 lines; of the wings 4 lines.

148. *LAMPROGASTER PUNCTATA*, n. s., mas. Nigra, capite antico testaceo, orbitis albidis, antennis halteribusque testaceis, pectore vittis duabus testaceis, pedibus piceis, alis nigro-fuscis guttis decem discalibus luridis guttâque apicali albâ.

Male. Black, slightly shining. Head very shining in front, testaceous about the mouth, whitish about the eyes. Antennæ testaceous. Pectus with a testaceous stripe on each side. Legs piceous. Wings blackish-brown, with about ten lurid dots on each, and with a larger white dot on each tip. Halteres testaceous. Length of the body $1\frac{3}{4}$ line; of the wings 3 lines.

149. *LAMPROGASTER GUTTATA*, n. s., mas. Nigra, orbitis albidis, epistomate antennis halteribusque testaceis, pectore vittis duabus vix determinatis testaceis, pedibus piceis, alis nigro-fuscis guttis plurimis apicibusque limpidis.

Male. Black, slightly shining. Head very shining in front, testaceous about the epistoma, whitish about the eyes. Antennæ testaceous. Pectus with an indistinct testaceous stripe on each side. Legs piceous. Wings blackish-brown, with many limpid dots, the largest on the hind border; tips limpid. Halteres testaceous. Length of the body $1\frac{1}{2}$ line; of the wings $2\frac{1}{2}$ lines.

The two preceding species may perhaps form a new genus, the peculiar characters of *Lampromyia* being hardly conspicuous in them.

Gen. SOPHIRA, Walk.

150. *SOPHIRA CONCINXA*, n. s., fœm. Testacea, frontilibus luteis, thorace fasciis duabus lateralibus vittisque duabus nigricantibus, pectore ex parte abdominisque vittis quatuor nigris, tibiis posticis fusciscentibus, alis obscure fuscis apices versus pallidè fuscis strigis basalibus fasciâque abbreviatâ limpidis.

Female. Testaceous, shining. Head with luteous frontalia. Thorax with two blackish stripes, and on each side with two blackish bands. Pectus partly black. Abdomen with four black stripes. Hind tibiæ brownish. Wings dark brown, pale brown on the apical third part, with limpid basal streaks, and with a limpid slightly abbreviated band beyond the middle; veins black. Length of the body 3 lines; of the wings 6 lines.

Gen. RIOXA, Walk.

151. *Rioxa lanceolata*, Walk. See page 35. This species is very variable in the breadth of the stripes of the thorax, and in the number and size of the spots on the wings.

152. *RIOXA CONFINIS*, n. s., fœm. Ferruginea, abdomine nigricante, alis nigro-fuscis basi guttisque octo limpidis.

Female. Ferruginous. Abdomen blackish. Wings blackish-brown, limpid towards the base, with three triangular limpid spots on the costa, with two limpid spots (one of them double) on the hind border, and with two on the disk; veins black. Length of the body 3 lines; of the wings 6 lines.

Gen. DACUS.

153. *Dacus æneus*, *Wied. Auss. Zweifl.* ii. 513. 2.

Inhabits also Java.

154. *DACUS DETERMINATUS*, n. s., mas. Nigro-æneus, capite antennis pedibusque fulvis, thorace vittis tribus albidis duabusque fulvis, abdomine ferrugineo basi nigro, tibiis anticis tarsisque fuscis, alis sublimpidis apice fasciisque duabus fuscis.

Male. Æneous-black. Head and antennæ tawny. Thorax with three whitish stripes and with two tawny stripes; the latter are united at the tip of the scutellum, and the whitish bands extend obliquely on each side to the pectus. Abdomen ferruginous, black above at the base. Legs tawny; tips of the femora darker; posterior femora minutely spinose beneath; tarsi and fore tibiæ brown. Wings nearly limpid, brown from the discal transverse vein to the tips, and with two brown bands; 1st band very imperfect; 2nd very pale and diffuse on the hind half of the wing. Halteres whitish. Length of the body $4\frac{1}{2}$ lines; of the wings 7 lines.

155. *DACUS FIGURATUS*, n. s., fem. Niger, capite antennis pedibusque fulvis, vertice nigro, thorace vittis tribus (intermediâ quadriramosâ) pectoreque testaceis, abdomine vittâ anticâ fasciâque luteis, tibiis tarsisque posterioribus fuscis, alis subcinereis apice fuscis plagâ mediâ costali luridâ, halteribus albidis.

Female. Black, shining. Head and antennæ pale tawny; vertex black. Thorax with three testaceous stripes, the middle one emitting two oblique branches on each side. Pectus with two testaceous stripes. Abdomen with a luteous stripe extending from the base to the middle, where it is united to a luteous band. Legs tawny; posterior tibiæ and tarsi brown. Wings slightly greyish, with a large lurid space along the middle of the costa; tips brown; veins black. Halteres whitish. Length of the body $3\frac{1}{2}$ lines; of the wings 6 lines.

Gen. NOEETA, *Desv.*

156. *NOEETA LATIUSCULA*, n. s., mas. Nigra, capite testaceo, thorace cinereo, scutello nitido, tibiis tarsisque albidis, illis fusco-fasciatis, alis nigro-fuscis guttis plurimis limpidis apud costam dilatatis limpidis fusco-fasciatis.

Male. Black. Head testaceous, with white tomentum in front and beneath. Antennæ and halteres testaceous. Thorax with grey tomentum. Scutellum brilliant black. Abdomen shining. Tibiæ and tarsi whitish, the former with brown bands. Wings blackish-brown, with many limpid dots; costal part limpid, somewhat dilated, with transverse brown streaks. Length of the body $1\frac{1}{2}$ line; of the wings 3 lines.

Gen. TRYPETA, *Meig.*

157. *TRYPETA RUDIS*, n. s., fem. Nigra cinereo-tomentosa, capite thoracis scapulis fasciâ interruptâ scutello abdominis apice pedibusque testaceis, alis sublimpidis fasciis duabus fuscis 1^a posticè abbreviatâ.

Female. Black, with cinereous tomentum. Head testaceous in front and beneath. Antennæ, legs and halteres testaceous. Scapulæ of the thorax,

an interrupted band, scutellum, and tip of the abdomen also testaceous. Wings nearly limpid, with two brown bands, the interior one abbreviated hindward; veins black, testaceous at the base. Length of the body 3 lines; of the wings 5 lines.

Gen. *UROPHORA*, *Desv.*

158. *UROPHORA FASCIATA*, n. s., fœm. Nigra nitens, capite antennis scapulis scutello abdominis terebrâ pedibusque testaceis, abdomine fasciis duabus albido-tomentosis, femoribus posterioribus piecis, alis nigro-fuscis vittâ latâ subobliquâ limpidâ apicem versus fureatâ et arcuatâ.

Female. Black, shining. Head testaceous, whitish in front and beneath. Antennæ, scapulæ, scutellum, legs and halteres testaceous. Abdomen with two bands of whitish tomentum. Terebra testaceous, long, slender. Posterior femora mostly piecous. Wings blackish-brown, with some paler spots along the costa, and with a broad, slightly oblique limpid stripe, which towards its tip is divided and curved to the hind border. Length of the body 4 lines; of the wings 6 lines.

Subfam. *ACHIIDES*, *Walk.*

Gen. *ACHIAS*, *Fabr.*

159. *Achias maculipennis*, *Westw.* See page 36.

There are two specimens of the male of this species, and the petiole with which the head is furnished on each side is much longer in one specimen than in the other, and in the latter is much longer than in the male from Singapore. I am indebted to Mr. Westwood for the correction of an error in page 33, where the female of this species is described by the name of *Themara ampla*.

Subfam. *DIOPSIDES*, *Walk.*

Gen. *DIOPSIS*, *Linn.*

160. *Diopsis quinqueguttata*, *Walk.* See page 36.

161. *Diopsis quadriguttata*, *Walk.* See page 37.

162. *DIOPSIS DISCREPANS*, n. s., mas et fœm. Nigra nitens, antennis fulvis, abdomine apud petioli apicem maculis duabus rufis tomento albo plagiatis, pedibus rufescentibus, tarsis testaceis, alis sublimpidis maculâ apud venam transversam præbrachialem fasciâque exteriore fuscis. *Mas.* Oculorum petiolis corpore paullo longioribus aut brevioribus. *Fœm.* Oculorum petiolis corporis dimidio brevioribus.

Male and Female. Black, shining. Antennæ tawny. Abdomen at the tip of the petiole with two red spots, each accompanied by a patch of white tomentum. Legs reddish; tarsi testaceous. Wings nearly limpid, with a brown spot on the præbrachial transverse vein, and with an exterior brown band; veins black. Halteres white.

Male. Petioles of the eyes a little longer or a little shorter than the body.

Female. Petioles of the eyes less than half the length of the body. Length of the body $2\frac{1}{2}$ lines; of the wings 4 lines.

Subfam. SEPSIDES, *Walk.*Gen. CALOBATA, *Fabr.*

163. CALOBATA STRENUA, n. s., fem. Nigra sat valida, capite antico nigro-cyaneo, thorace subcinereo, femoribus mediis flavo unifasciatis posticis flavo bifasciatis, tarsis anticis albis, alis subcinereis fasciâ latâ fuscâ apice subfuscescentibus, halteribus piceis.

Female. Black, rather stout. Head shining, blackish-blue in front, with white tomentum about the eyes. Thorax slightly tinged with grey tomentum. Legs long, slender; middle femora with one yellow band; hind femora with two yellow bands, one of them at the base; fore tarsi white. Wings slightly greyish, with a broad brown band beyond the middle; tips slightly brownish; veins black. Halteres piceous. Length of the body 6 lines; of the wings 8 lines.

164. CALOBATA CEDENS, n. s., fem. Nigro-cyanea nitens, antennis abdomine pedibusque nigris, pectore plagis duabus albo-tomentosis, femoribus anticis basi testaceis posterioribus testaceis nigro-fasciatis, tarsis anticis albis, alis subcinereis fasciâ fuscâ apice subfuscescentibus.

Female. Blackish-blue, shining. Antennæ, abdomen and legs black. Pectus with a patch of white tomentum on each side. Legs long and slender; fore femora testaceous towards the base; posterior femora testaceous, with blackish bands; fore tarsi white. Wings slightly greyish, with a brown band beyond the middle; tips slightly brownish. Halteres testaceous, with blackish knobs. Length of the body $3\frac{1}{2}$ –4 lines; of the wings 6–7 lines.

Gen. CARDIACEPHALA, *Macq.*

165. CARDIACEPHALA LONGICOLLIS, n. s., mas. Rufo-lutea, capitis maculis duabus facieque nigris, thorace longissimo lanceolato lineis duabus glaucis, abdomine apicem versus nigro, tibiis tarsisque nigricantibus, tarsis anticis basi albis, alis subcinereis apice fuscescentibus, apud costam subluteis.

Male. Reddish luteous. Head with a black spot on each side of the vertex; face black, with white tomentum on each side. Thorax very long, attenuated in front, with a glaucous stripe on each side. Abdomen black towards the tip, not longer than the thorax. Legs long and slender; tibiae and tarsi blackish; fore tarsi white at the base. Wings slightly greyish, brownish at the tips, and with a luteous tinge along the costa; veins black, tawny towards the base. Length of the body 5 lines; of the wings 7 lines.

Subfam. PSILIDES, *Walk.*Gen. MICROPEZA, *Meigen.*

166. Micropeza fragilis, *Walk.* See page 37.

Gen. NERIUS, *Wied.*

167. Nerijs fuscipennis, *Macq.* See page 38.

Gen. TEXARA, *Walk.*

168. Texara compressa, *Walk.* See page 38.

Subfam. GEOMYZIDES, *Fallen.*Gen. GYMNOPIA, *Fallen.*

169. GYMNOPIA? GUTTICOSTA, n. s., fem. Nigra nitens, pectoris lateribus canis, thoracis fasciâ abdominisque basi pallidè flavis, tibiis tarsisque ferrugineis, alis subflavescentibus guttâ costali nigrâ.

Female. Black, shining. Head wanting. Thorax with a pale yellow band. Pectus hoary on each side. Abdomen blackish, cupreous towards the base, which is pale yellow. Tibiæ and tarsi ferruginous. Wings slightly yellowish, with a black dot on the costa before half the length; veins yellowish. Length of the body $1\frac{1}{2}$ line; of the wings 3 lines.

170. GYMNOPIA INFUSA?, n. s., mas. Nigra, thorace subpubescente, scutello longi-obconico, abdomine æneo-nigro, pedibus halteribusque testaceis, alis limpidis venis nigris.

Male. Black. Head wanting. Thorax slightly pubescent. Scutellum long-obconic. Abdomen æneous-black, shining. Legs and halteres testaceous. Wings limpid; veins black; discal transverse vein parted by more than its length from the border, and by less than twice its length from the præbrachial transverse vein. Length of the body $1\frac{1}{4}$ line; of the wings $2\frac{1}{2}$ lines.

On a New Organ in Insects. By JOHN BRAXTON HICKS, Esq.,
M.D. Lond., F.L.S. &c.

[Read June 17, 1856.]

ABOUT a month since my attention was directed towards a peculiar structure in the *halteres* of the *Rhingia rostrata*, by Mr. Purkiss, who is an energetic and zealous searcher for microscopical objects, and who, from the position and structure of this organ, considered it to be the organ of smell. How far this is probable, I will leave the Society to judge at the termination of this paper. I instantly directed my attention to the subject, and I will endeavour to lay before the Society the results at which I have arrived up to the present time, apologizing for the incompleteness of the investigation, in consequence of my anxiety to bring it before the Society previous to the summer recess.

If we dissect a perfect fly, there will be seen in the centre of the thorax the great thoracic ganglion, which is formed by the fusion of the three thoracic ganglia into one. From thence it will be plainly seen that the first branch passes to the anterior leg; the second (much larger) enters the base of the wing after giving off a few branches to the muscles; the third branch passes

to the middle leg; and the fourth (the largest of all) passes straight into the *halteres*; the fifth set supplying the posterior legs. I have drawn the nerves of the Drone (Plate V. fig. 1) and Blow-fly (fig. 2).

In the *Lepidoptera* there are two thoracic ganglia. The first (the smaller) supplies the anterior legs. The second gives off the first pair to the anterior wings, the second pair to the middle legs, the third pair to the second wings, and the fourth to the posterior legs.

In the *Lucanus Cervus* (*Coleoptera*) we find three thoracic ganglia: the anterior supplies the first pair of legs; the second gives a pair to the elytra and a pair to the middle legs; while the third ganglion supplies a pair to the second wings and the posterior legs.

In the *Orthoptera*, in the Locust for example, the arrangement is similar as to the origin of the nerves.

In the *Hymenoptera* the arrangement is as in the *Lepidoptera*.

In the *Neuroptera* (Dragon-fly) there are three thoracic ganglia, the nerves passing off in the same manner as in the *Lucanus Cervus*.

In the *Hemiptera* the thoracic ganglia are fused into one, as in the Fly. But the nerve to the anterior wing is twice the size of that to the posterior.

From the above statement, it will be seen that we find in all insects—

1st, A pair of nerves going to and entering the base of each of the wings; and in the *Diptera*, of the *halteres* also.

2nd, The nerves supplying the posterior wings or *halteres* are generally the larger.

As there are no muscles in either the wings or *halteres*, these nerves must be sensory.

I shall now describe the curious organs to which they proceed.

And first as regards the *halteres*. Situated on the pleura, and closely adjoining a large spiracle, we find the joint very free, so that these organs can be moved with such rapidity as to render them invisible when in motion; and they are beautifully protected in the Fly by the scales, which in *Rhingia rostrata* form a very beautiful object.

The *halteres* consist of a base, shaft, and head; the relative proportion of each varying in different insects. On each side of the base is a ridge, and on these ridges are situated two similar structures. In the *Rhingia rostrata* (Plate V. fig. 3), for instance,

there are about twenty rows of vesicles, each row separated from the adjoining one by a slight distance. There is a row of hairs between each row of vesicles, the hairs arching over them, and thereby forming a protection from extraneous particles. These hairs are in pairs, one pair being opposite to each vesicle. The rows on the ridge are arranged transversely to the axis of the *halteres* (fig. 3 *a, c*). The vesicles themselves are very transparent, and hemispherical or even more nearly spherical projections, apparently cuticular. This is well seen by a profile view, fig. 3 *e*. Their diameter, in this fly, is about $\frac{1}{4000}$ th of an inch: each vesicle nearly touches its neighbour.

Beneath these, but on one side only, is a broader, flatter face, on which the vesicles are more distinct, and at a farther distance from each other, the rows arranged parallel to the axis of the *halteres*, and only one hair opposite each vesicle, there being some alternate. The diameter of each of these is about $\frac{1}{3700}$ th of an inch. There is a smaller group of vesicles situated on one side of this latter face, in number about ten; the individual vesicles are rather larger.

In the *Tabanidæ* the arrangement is very similar, with the addition of seven vesicles on the shaft of the *halteres*, to the upper part of the facet of the ridge, and another group of eight or nine beneath the ridge opposite the broader facet.

In *Tipula* the same general arrangement holds, except that in the facets on the ridge the vesicles are arranged in a quincuncial manner, and are larger than those on the broad facet, being about $\frac{1}{1900}$ th of an inch, with numerous hairs between each (fig. 4 *a*). The broader facet too is less extensive relatively to the others, and is also quincuncial in arrangement, of the diameter of $\frac{1}{3000}$ th of an inch (fig. 4 *b*). Besides these, in the largest Crane-fly, on the joint, there is a cone, having on its flattened apex a group of about eight or nine vesicles, with numerous very small hairs between them (fig. 4 *c*).

The shaft of the *halteres* is tubular, and through it apparently passes a branch of the nerve, which seems to expand as it reaches the head, and which head contains cellular substance, and has externally a groove on one side, just below its greatest diameter. The membrane lining the groove is apparently very delicate. A group of hairs is generally found at the end of the groove.

I have now described the principal features of these curious structures, as found in the *halteres* of the *Diptera*; none that I have examined have been free from them. The number of vesicles

in each of the *halteres* (in *Rhingia* for instance) is about 120 for each principal face, making for the three faces 360.

Thus we find a nerve, the largest nerve except the optic, entering the *halteres*, where there are no muscles, therefore this nerve must be one of sensation; and I think it will be allowed that it must be one of *special* sensation.

But as there is also a nerve going to the base of the wings, we might expect to find similar structures there, and we shall not be disappointed; for if we look on the subcostal nervure at the base, we shall see a group of vesicles of a similar character to those on the *halteres*,—not so beautifully arranged, but still very distinct, as is clearly shown in the *Tabanidæ* and some *Muscæ* (fig. 5). They extend in a single row some little distance up the nervure, and are found on both sides of the nervure, but principally on the *upper* side.

These organs are not confined to the *Diptera*, but I believe are to be found in all insects; at least I have found them as far as I have examined. They exist on both sides, but principally on the upper side of the base of the subcostal nervure; on the costal nerve in *Hemiptera*. Those on the second wing are generally the largest in number and size; but that, I suspect, is determined by the size of the nerve proceeding to them. In Moths they are very apparent, being greatest in the *Noctuæ* and *Bombycidæ*. There are about 100 vesicles on the upper surface of the posterior wing, and half that number beneath, besides some few on the nervures. (See fig. 7 *b*.) In the Butterfly they are smaller, but arranged in more definite groups, about three in number. In *Coleoptera* and *Neuroptera* they are arranged in long rows along the subcostal nerve; they are more apparent in *Coleoptera* than in *Neuroptera*. In the *Hymenoptera*, for instance the Bee, they are found in a rounded group of about forty on each side (fig. 6 *a*).

In a subsequent paper I hope to show a more extended analysis of this structure in the different tribes of Insects.

Now, what is the nature of these organs? Are they organs of smell, as suggested by Mr. Purkiss? As the olfactory organ has never yet been decided on, it seems to me not improbable that they may be the organs of that sense; for, first, it is not likely that they should be the organ of hearing, as they are in constant motion, and situated near the source of the hum of the wings, so that other sounds would be drowned. 2ndly. It is not necessary that the power of smell should be in the head. It is situated in

the commencement of the air-passages in the upper animals, probably because the current of air or water passing the olfactory nerves is there most powerful; but in the spiracle-breathing insect the greatest currents are in the neighbourhood of the wing, and near the greatest thoracic spiracle. The motion of the *halteres* also permits a greater exposure to odours floating in the air.

That the olfactory nerves should be necessarily, and by analogy, always before the optic, will not hold good below Fishes, where they first appear in that position. Otherwise the auditory apparatus in *Crustacea* ought to be behind the optic. In fact, there is no known analogy on this point, as no olfactory organs have yet been described below *Vertebrata*. Besides, if there are no nerves in front of the optic except those to the mouth and antennæ, either these latter must be olfactory organs, or the olfactory organs must be sought for elsewhere behind.

It may be added, that the respiratory apparatus is diffused (as are the nervous centres), and not connected with the oral or nasal aperture; and although the sensations be the same, analogy forms no sort of argument that the organs of sensation should always occupy precisely the same place.

DESCRIPTION OF PLATE V.

- Fig. 1.* Nervous system of the Drone-fly (*Eristalis tenax*): *a*, nerve of first leg; *b*, nerve of second leg; *c*, nerve of third leg; *d*, nerve of wing; *e*, nerve of one of the halteres.
- Fig. 2.* Nervous system of Blow-fly (*Musca vomitoria*); nerves lettered as above.
- Fig. 3.* Details of *Rhingia rostrata*: *3 a*, base of one of the halteres: *a*, group of vesicles on ridge; *b*, ditto on the broad facet; *b'*, a group of larger vesicles on the side of *b*. *3 b*, base of one of the halteres, another view, showing, *a'*, group of vesicles on the other ridge; *3 c*, magnified vesicles of the ridge, diameter 4000th of an inch; *3 d*, ditto on broad facet, diameter 3700th of an inch; *3 e*, profile of *3 c*.
- Fig. 4.* Details of the largest Crane-fly (*Tipula oleracea*?): *4 a*, base of one of the halteres; *4 b*, ditto, another view; *4 c*, several of the vesicles on the ridge, diameter 1900th of an inch; *4 d*, ditto on broad face, diameter 3000th of an inch; *4 e*, ditto on the conical lobe at the junction of the halteres with the body.
- Fig. 5.* Details of Blow-fly (*Musca vomitoria*): *5 a*, base of one of the halteres; *5 b*, another view of ditto; *5 c*, vesicles on the ridge, diameter 2720th of an inch; *5 d*, ditto on the broad facet with the small lateral group, diameter 3730th of an inch.
- Fig. 6.* Details of Bee (*Andrena Mouffetella*): *6 a*, dorsal view of the vesicles on the costa of the hind wing; *6 b*, section of ditto.
- Fig. 7 a*, Subcostal nervure of the Ermine Moth, upper side; *7 b*, section of ditto.
- Fig. 8 a*, Base of anterior wing of *Leptis scolopacea*, showing the base of the subcostal nervure on the upper side; *8 b*, ditto on the under side.

Catalogue of the Homopterous Insects collected at Sarawak, Borneo, by Mr. A. R. WALLACE, with Descriptions of New Species. By FRANCIS WALKER, Esq., F.L.S. &c.

[Read January 20th, 1857.]

Ord. **CICADINA**, *Burmeister*.

Fam. **STRIDULANTIA**, *Burm.*

Gen. **PLATYPLEURA**, *Amyot et Serv.*

1. *Platypleura semilucida*, *Walk.* See page 83.

Gen. **TACUA**, *Amyot et Serv.*

2. *Taqua speciosa*, *Illiger* (Tettigonia).
Inhabits also Hindostan.

Gen. **DUNDUBIA**, *Amyot et Serv.*

3. *Dundubia immacula*, *Walk. Cat. Homopt.* pt. 1. 50.

Inhabits also Tenasserim.

4. *Dundubia phæophila*, *Walk. Cat. Homopt.* pt. 1. 52.

Inhabits also Corea.

5. *Dundubia Thalia*, *Walk. Cat. Homopt.* pt. 1. 72.

6. *Dundubia intemerata*, *Walk.* See p. 84.

7. **DUNDUBIA DECEM**, n. s., fœm. Ferrugineo-lutea lata, mesothoracis scuto viridi, scutello fasciâ latâ interruptâ nigricante, abdominis segmentis nigro marginatis, tibiis suprâ tarsisque nigris, alis vitreis; anticarum areolis marginalibus fuscescente vittatis, venis viridibus nigro variis, venis transversis apice venulisque transversis nigricante maculatis.

Female. Ferruginous luteous, broad. Scutum of the mesothorax green; scutellum with a broad diffuse blackish band consisting of four parts, and with the apical ridges partly black. Hind borders of the abdominal segments, tibiæ above and tarsi black. Wings vitreous. Fore wings with an indistinct pale brown streak on each marginal arcole; veins green, partly black; transverse veinlets and tips of the marginal veins clouded with blackish-brown. Length of the body 18 lines; of the wings 58 lines.

8. **DUNDUBIA DUARUM**, n. s., mas. Fulva, capite vittis tribus angulosis fasciâque anticâ prothorace vittis quatuor mesothoracis scuto vittis duabus scutelloque vittis quinque nigris, tympanis abdominis apicem attingentibus apices versus nigris, abdominis segmentis testaceo aut viridi marginatis, pedibus nigro variis, alis vitreis, anticarum venis nigris ex parte rufescentibus, venulis transversis 1â et 2â nigricante maculatis.

Male. Tawny. Head above with three angular black stripes, and in front with a black band. Prothorax with four black stripes, which are dilated in front. Scutum of the mesothorax green, with a black stripe on each side; scutellum with five black stripes, the inner pair interrupted, the outer pair broad.

Opercula green; drums black towards the tips and along the inner border, extending to the tip of the abdomen. Legs testaceous, femora and tibiae striped with black; tarsi black; hind tarsi testaceous. Wings vitreous. Fore wings green at the base; veins black, reddish along the costa and towards the base; 1st and 2nd transverse veinlets clouded with blackish-brown. Length of the body 15 lines; of the wings 46 lines.

Gen. FIDICINA, *Amyot et Serv.*

9. *Fidicina Aquila*, *Walk. Cat. Homopt.* pt. 1. 84.

Inhabits also Corea.

Gen. HUECHYS, *Amyot et Serv.*

10. *Huechys splendidula*, *Fabr. Syst. Rhyn.* 42. 49.

Inhabits also Hindostan and Java.

11. *HUECHYS FACIALIS*, n. s., mas. Atrâ, fronte facie mesothoracisque maculis duabus testaceis, pectoris maculis duabus et segmentorum abdominalium marginibus rufis, alis anticis fuscis, posticis subcinereis.

Male. Deep black, shining. Front and face testaceous. Scutellum of the mesothorax with a very large testaceous spot on each side. Pectus with a red spot on each side. Hind borders of the abdominal segments red. Fore wings brown. Hind wings slightly greyish. Length of the body 9 lines; of the wings 22 lines.

Fam. FULGORINA, *Burm.*

Subfam. FULGORELLÆ, *Spinola.*

Trib. FULGORITES, *Spinola.*

Subtrib. FULGOROIDES, *Spinola.*

Gen. HOTINUS, *Amyot et Serv.*

12. *Hotinus Sultana*, *White, Proc. Zool. Soc. Lond.* 1847, 83; *Ann. Nat. Hist.* xx. 204.

13. *HOTINUS INTRICATUS*, n. s., mas. Ferrugineus, rostro ascendente albo punctato apice luteo corpore vix brevior, abdomine nigro segmentorum marginibus viridibus, tibiis tarsisque nigris, alis anticis viridi-venosis fasciis interioribus testaceis, maculis exterioribus luteis, posticis lætè cyaneo-viridibus, margine latissimo purpurascente nigro.

Male. Ferruginous. Rostrum slightly curved and ascending, sprinkled with white flecks, rounded and luteous at the tip, a little shorter than the body. Abdomen black; hind borders of the segments green. Tibiæ and tarsi black. Fore wings black, with three testaceous interior bands, and with twelve exterior luteous spots; 3rd band interrupted; veins green, brighter on the interior part than on the exterior part, where they are differently arranged. Hind wings bright bluish-green, with very broad purplish-black borders. Length of the body without the rostrum 11 lines; of the wings 33 lines.

This species is closely allied to *H. maculatus*, *Oliv.*, but in the latter species

the rostrum is wholly black and more slender at the tip; the fore wings have green spots and no bands, and the blue part of the hind wings extends more towards the borders in front and less so hindward.

14. *NOTINUS CULTELLATUS*, n. s., mas. Pallidè viridis, rostro compresso subascendente corporis ferè longitudine, abdomine testaceo, alis anticis guttis nominis testaceis fusco marginatis, posticis luteis.

Male. Pale green. Rostrum compressed, keeled, hardly ascending, acuminate at the tip, testaceous above, a little shorter than the body. Abdomen and legs testaceous. Fore wings with a few testaceous brown-bordered dots of various size. Hind wings luteous. Length of the body without the rostrum 8 lines; of the wings 28 lines.

Subtrib. *LYSTROIDES*, *Spinola*.

Gen. *APILENA*, *Guérin*.

15. *Aphæna scutellaris*, *White*, *Ann. Nat. Hist.* xvii. 330.

16. *Aphæna Saundersii*, *White*. See page 84.

17. *Aphæna basirufa*, *Walk. Cat. Homopt.* pt. 2. 278.

It differs slightly from the three Silhet specimens in the British Museum, which are exactly alike.

18. *APILENA SATURATA*, n. s., mas. Nigra, thoracis lateribus ferrugineis, alis anticis viridi-nigris e lineâ transversâ arcuatâ lutescente in areas duas divisas, arcâ interiore longiore semicirculis rufescentibus ornatâ, exteriore subrotundâ creberrimè luteo-venosis, posticis lineâ rectâ divisas, marginis interioris dimidio basali flavo plagiato.

Male. Black. Ferruginous piceous, black beneath. Wings greenish-black, divided into two areas by a transverse line, which is curved and pale luteous in the fore wings, straight and rather darker in the hind wings; interior area longer than the other one, adorned in the forewings with various little luteous half-ringlets which are accompanied by dots, in the hind wings with partly green veins, and with a yellow patch towards the base of the interior border; exterior area nearly round, most thickly crowded with luteous veins; a glaucous bloom covering the interior area on the under side, and forming a semicircle on the exterior one. Length of the body 11 lines; of the wings 30 lines.

This species and *A. rosea*, Guér., are closely allied in structure and in the disposition of the colours, and are distinguished from the two preceding species by their much more ample wings.

19. *APILENA VERIS-AMOR*, n. s., mas et fœm. Nigra, facie pedibusque ferrugineis, abdomine rufo, alis anticis saturatè et latissimè viridibus, costâ lineâ arcuatâ exteriore maculâque basali flavis, subtùs tomento albo variis, posticis niveis apice fulvis.

Male and Female. Black. Face and legs ferruginous. Abdomen red. Fore wings intensely grass-green, with the costa, a basal spot, a few dots in the disk, and an exterior curved transverse line yellow; tips tawny; under side with various marks of white tomentum, which also appears on

the costa above at the base. Hind wings snow-white, with tawny tips.

Length of the body 11 lines; of the wings 26 lines.

This species has narrow fore wings like *A. scutellaris*, but belongs to a distinct group.

20. *APHLENA UNIFORMIS*, n. s., fœm. Fusea, capite thorace anticeo pedibusque fulvis, alis fulvo venosis, anticis basi nigris fasciâ contiguâ flavâ.

Female. Brown. Head, fore part of the thorax and legs tawny. Abdominal segments with red borders. Wings with tawny veins. Fore wings narrow, black at the base, near which there is a yellow band. Length of the body 8 lines; of the wings 22 lines.

This species will form a fourth group in the genus. The veins of the fore wings have the same structure over the whole surface.

Subtrib. DICTYOPHOROIDES, *Spinola*.

Gen. DICTYOPHORA, *Germer*.

21. *Dictyophora speilinea*, *Walk.* See page 84.

22. *DICTYOPHORA SPECICARINA*, n. s., mas. Testacea, capite thoraceque viridi carinatis, capite lanceolato tricarinato subseendente apice fusco, thorace septem-carinato, tibiis tarsisque rufis, alis hyalinis venis fulvis apice fusco nebulosis, stigmate fulvo.

Male. Testaceous. Head and thorax with green keels. Head lanceolate, very slightly ascending, with three ridges, brown at the tip, as long as the breadth of the thorax. Thorax with seven ridges, three dorsal and four lateral. Tibiæ and tarsi red. Wings hyaline; veins and stigma tawny; apical transverse veinlets clouded with brown. Length of the body 5 lines; of the wings 12 lines.

Gen. LEUSABA, n. g.

Dictyophoræ affinis. Caput arcuatum, breve, vertice marginato, fronte planâ longi-subquadrata antice latiore, facie lanceolata fronte paulò brevior. Prothorax marginatus, valdè arcuatus, margine postico excavato et intus angulato. Mesothorax tricarinatus. Pedes longi. Alæ antiæ extus latiores, areolis basalibus longissimis, discalibus et marginalibus brevioribus, venis marginalibus nonnullis furcatis, venulis transversis costalibus et submarginalibus nullis.

Allied to *Dictyophora*. Head short, arched; vertex with an elevated border, about four times broader than long; front smooth, subquadrate, much longer than broad, slightly widening in front, with two indistinct furrows which converge forwards; face lanceolate, a little shorter than the front. Prothorax much arched, with an elevated border, excavated and much arched on the hind side. Mesothorax with three keels. Legs long. Fore wings widening towards the tips; five basal areolets very long; six discal areolets a little longer than the marginal areolets, the latter numerous, and four of them forked; no transverse costal or submarginal veinlets.

23. *LEUSABA MARGINALIS*, n. s., mas. Viridis, capitis thoracisque marginibus et carinis ex maximâ parte testaceis, thorace guttis nonnullis nigro-fuscis,

alis hyalinis, anticis apud marginem anteriorem fuscis, venis nigris basi fulvis, stigmate fusco.

Male. Green. Borders and keels of the head and of the thorax for the most part testaceous. Thorax with a few blackish-brown dots. Wings hyaline. Fore wings brown along the exterior border; veins black, tawny towards the base; stigma brown. Length of the body 5 lines; of the wings 14 lines.

Gen. ISPORISA, n. g.

Leusabæ affinis. *Caput* breve, valdè arcuatum, vertice posticè excavato et marginato, fronte facieque marginatis et medio carinatis, fronte subquadrata anticè latiore, facie trigonâ. *Thorax* brevis. *Prothorax* et *mesothorax* tricarinati, carinis lateralibus valdè obliquis. *Alæ* anticæ angustæ, areolis basalibus longissimis, discalibus et marginalibus brevioribus, venis marginalibus simplicibus, venulis transversis costalibus nonnullis exterioribus, submarginalibus nullis.

Allied to *Leusabæ*. Head short, much arched; vertex with three angles in front; hind part excavated, and with an elevated border; front and face with elevated borders and with a middle keel; front subquadrate, a little longer than broad, slightly widening in front, its sides indistinctly concave; face triangular, a little broader and longer than the front. Thorax short. Prothorax and mesothorax with three keels, the lateral pair very oblique. Wings narrow. Fore wings with the five basal areolets very long; six discal areolets hardly longer than the marginal areolets, which are rather more numerous; all the latter are simple, and form a continuous row with the few very oblique exterior costal veinlets; no submarginal veinlets.

24. ISPORISA APICALIS, n. s., fœm. Viridis, capite thorace pectoreque nigro maculatis, abdomine nigro, segmentorum marginibus posticis viridibus, pedibus nigro notatis, alis subviridis, anticis apice fuscis, venis nigris basi fulvis, stigmate nullo.

Female. Green. Head with three black spots in front of the vertex; front and face with reddish borders, each with two black spots. Prothorax and mesothorax with a black dot on each side. Pectus with black spots. Abdomen black; hind borders of the segments green. Legs marked with black. Wings slightly lurid. Fore wings with brown tips; veins black, tawny towards the base; no stigma. Length of the body 3 lines; of the wings 8 lines.

Gen. EPORA, n. g.

Dictyophoræ affinis. *Caput* tricarinatum, suprâ transversum; vertex conicus; frons longissima, linearis; facies brevior, lanceolata. *Prothorax* quadricarinatus, valdè arcuatus. *Mesothorax* tricarinatus. *Pedes* longiusculi. *Alæ* anticæ sat angustæ, areolis basalibus longissimis, longitudinis bis trientem occupantibus, discalibus et marginalibus subæqualibus, venulis transversis costalibus obliquis parallelis, submarginalibus nullis.

Allied to *Dictyophora*. Head with three keels, transverse above; vertex conical; front very long, with parallel sides; face lanceolate, much shorter than the front. Prothorax much arched, with four keels. Mesothorax with three keels.

Legs rather long. Fore wings rather narrow; basal areolets as long as two-thirds of the length of the wing; marginal areolets a little longer than the discal areolets, all of them simple; transverse costal veinlets oblique, parallel except towards the tip.

25. *EPORA SUBTILIS*, n. s., mas et fem. Viridis (mas) aut testacea (fem.), alis hyalinis, venis viridibus, stigmatibus nullo.

Male and Female. Green (*male*) or testaceous (*female*). Wings hyaline; veins green; no stigma. Length of the body $2\frac{1}{2}$ –3 lines; of the wings 6–7 lines.

Gen. DARADAX, *Walk.*

26. *DARADAX ACRIS*, n. s., mas. Viridis, mesothorace tricarinato, abdomine albo-tomentoso, alis anticis fusciscentibus marginatis, posticis albis.

Male. Green. Head much longer than broad; vertex and front lanceolate, with a keel in the middle and one on each side. Mesothorax with 3 keels. Abdomen with whitish tomentum. Fore wings with brownish borders. Hind wings white. Length of the body 3 lines; of the wings 7 lines.

Subtrib. CIXIODES.

Gen. CIXIUS, *Latr.*

27. *Cixius pustulatus*, *Walk.* See page 87.

28. *CIXIUS FERREUS*, n. s., mas. *C. efferratus* valdè affinis. Ferrugineus, fronte facieque subcarinatis, pedibus fulvis, alis subcinereis, anticis maculâ discali interiore guttâque costali exteriore fuscis, venis fulvis.

Male. Very nearly allied to *C. efferratus*. Ferruginous. Head convex between the eyes; front and face with a slight middle keel; front much broader than long; face lanceolate, much longer than the front. Abdomen with the apical appendages much developed. Legs tawny. Wings slightly greyish. Fore wings slightly greyish, with a brown spot in the disk before the middle, and with a brown dot on the costa near the tip; veins tawny. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

29. *CIXIUS DIFFINIS*, n. s. Fuscus, subtus testaceus, fronte perangustâ, thorace vittâ dorsali fusiformi interlineatâ stramineâ, pedibus testaceis, alis fuscis, anticis fasciis duabus interruptis guttisque nonnullis pallidè viridibus.

Brown, testaceous beneath. Head narrow; vertex slightly concave; front very long and narrow, with three keels. Thorax with a fusiform straw-coloured dorsal stripe, divided longitudinally by a brown line. Legs testaceous. Wings brown. Fore wings with two pale green bands, and with a few pale green dots, of which the largest is on the costa near the tip; 1st band quite interrupted; 2nd slightly interrupted. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

30. *CIXIUS GUTTIFER*, n. s., fem. Testaceus, capite supra subquadrato subtus lanceolato, pectore guttis duabus anticis lateralibus nigris, alis anticis

pallidè testaceis subhyalinis nigro triguttatis, venis testaceis, posticis cinereis, venis nigricantibus.

Female. Testaceous. Head with elevated borders; vertex subquadrate; front and face with a middle keel; front full thrice longer than broad, slightly increasing in breadth towards the face, which is lanceolate and shorter than the front. Pectus with a black dot on each side in front. Fore wings pale testaceous, nearly hyaline, with a slightly darker spot near the tip of the costa, and with three black dots which form a curved line in the disk; veins testaceous. Hind wings grey with black veins. Length of the body 3 lines; of the wings 7 lines.

31. *CIXIUS ÆQUUS*, n. s., mas. Testaceus rufo varius, albido tomentosus, capite toto valdè angusto lateribus valdè elevatis, alis cinereis, anticarum venulis transversis costalibus duabus, exterioribus paucis

Male. Testaceous, with some red marks, slightly covered with whitish tomentum. Vertex, front and face very narrow; their borders much elevated. Wings greyish, with two oblique costal veinlets, and with a few discal exterior veinlets. Length of the body 2-2½ lines; of the wings 6-7 lines.

32. *CIXIUS PERPLEXUS*, n. s., mas. Niger, capitis lateribus elevatis carinâque testaceis, fronte testaceo conspersâ, vertice perangusto, abdominis segmentis testaceo marginatis, pedibus testaceis, alis anticis cervinis fusco conspersis, costâ margineque interiore pallidioribus guttis nigro-fuscis magis determinatis, posticis nigricantibus.

Male. Black. Head with testaceous elevated borders; vertex very narrow; front and face forming an elongated fusiform compartment with a testaceous keel and testaceous marks. Hind borders of the abdominal segments and legs testaceous. Fore wings fawn colour, sprinkled with brown, paler towards the tips; costa and interior border pale testaceous, with blackish-brown dots. Hind wings blackish. Length of the body 2 lines; of the wings 5 lines.

33. *CIXIUS INCLINATUS*, n. s., mas. Niger, capitis lateribus elevatis carinâque testaceis, vertice perangusto, frontis lateribus nigro punctatis, abdominis segmentis testaceo marginatis, pedibus testaceis, alis anticis testaceis fusco conspersis et nebulosis, stigmatè obscuriore, posticis cinereis.

Male. Black: like the preceding species in structure. Borders of the head and middle keel testaceous; borders of the front with minute black dots. Borders of the abdominal segments and legs testaceous. Fore wings testaceous, sprinkled and clouded with brown; stigma darker. Hind wings grey. Length of the body 1¼ line; of the wings 3½ lines.

34. *CIXIUS SIMPLEX*, n. s., mas. Niger, carinis pedibusque piceis, thorace tricarinato, abdomine subtis testaceo, apice albo densè floccoso, alis cinereo-hyalinis, venis nigris, stigmatè fusco.

Male. Black. Ridges of the head and of the thorax, and legs picous. Head with the borders much elevated; vertex subquadrate, a little narrower in front; front and face together fusiform, with a rather deep keel. Prothorax extremely short. Mesothorax with three parallel keels. Abdomen

testaceous beneath ; tip thickly covered with white flecks. Wings hyaline, slightly cinereous ; veins black ; exterior transverse veinlets and tips of the apical veins of the fore wings clouded with brown ; stigma brown. Length of the body 3 lines ; of the wings 7 lines.

35. *CIXIUS VILIS*, n. s., fœm. Niger, frontis lateribus femoribusque fulvis, thorace tricarinato, segmentorum abdominalium marginibus albidis, tibiis farsisque testaceis, alis hyalinis apice fuscis, venis nigris basi fulvis, stigmate sordidè testaceo posticè nigro.

Female. Black. Head with elevated borders ; vertex very narrow ; front with tawny sides, forming with the face a fusiform compartment which has a middle ridge. Prothorax extremely short. Mesothorax with three parallel keels. Segments of the abdomen with whitish borders. Legs testaceous ; femora tawny. Wings hyaline, slightly greyish, with brown tips ; veins black, tawny at the base ; stigma dingy testaceous, black hindward. Length of the body 2 lines ; of the wings 5 lines.

36. *CIXIUS MODICUS*, n. s., mas. Testaceus, capite suprâ angusto subtùs fusiformi, thoracis disco abdomineque suprâ fuscis, thorace tricarinato, alis subhyalinis ; anticis fusco vix trifasciatis apice fuscescentibus, venis nigris basi testaceis.

Male. Testaceous. Head with elevated borders ; vertex narrow ; front and face together fusiform with a middle ridge. Mesothorax with three parallel keels ; its disk brown. Abdomen above brown ; hind borders of the segments testaceous. Wings nearly hyaline ; fore wings with three slender and very incomplete brown bands ; tips brownish ; veins black, testaceous at the base. Length of the body 2 lines ; of the wings 5 lines.

37. *CIXIUS NEXUS*, n. s., fœm. Testaceus, capite subtùs perangusto, abdomine nigro marginibus testaceis, alis hyalinis, anticis testaceo fasciatis, fasciis interioribus nigricante marginatis exterioribus fusco nebulosis.

Female. Closely allied to *C. Meander*, Walk. Testaceous. Head with elevated borders, slightly ascending and conical above ; front and face very narrow. Abdomen black ; hind borders of the segments testaceous. Wings hyaline. Fore wings with irregular testaceous bands, of which the interior have incomplete blackish borders, and the exterior are partly clouded with brown ; veins testaceous. Length of the body 2 lines ; of the wings $4\frac{1}{2}$ lines.

38. *CIXIUS DESPECTUS*, n. s., fœm. Nigricans, carinis abdomine subtùs pedibusque testaceis, alis cinereo-hyalinis, anticis latis, fasciis plurimis transversis intùs nigricantibus extùs fuscis, venis nonnullis marginalibus furcatis.

Female. Blackish. Ridges of the head, abdomen beneath and legs testaceous. Head slightly conical and ascending above ; front and face together almost lanceolate, with a rather high middle keel. Wings hyaline, slightly cinereous ; fore wings broad, with several slender and interrupted bands, which are blackish towards the base and brown towards the exterior border ; veins testaceous. Length of the body 2 lines ; of the wings 5 lines.

This and some of the following species differ slightly from the typical *Cixii* in the veins of the wings, but hardly sufficiently to form new genera.

39. *CIXIUS DEDUCTUS*, n. s., fem. Piccus, capitis marginibus pedibusque testaceis, vertice subquadrato, fronte breviusculâ, facie lanceolatâ, alis subcinereis, anticearum venis marginalibus apice venulisque transversis infuscatis, margine exteriore albo punctato.

Female. Piccous. Head with elevated testaceous borders; vertex short; front and face with a testaceous keel, the former short, the latter lanceolate. Legs testaceous. Wings greyish; veins of the fore wings black, punctured with testaceous; transverse veinlets and tips of the marginal veins clouded with brown; a row of whitish dots along the exterior border. Length of the body $1\frac{1}{2}$ line; of the wings 4 lines.

40. *CIXIUS MUNIUS*, n. s., fem. Ferruginosus, capite perangusto lateribus elevatis nigro guttatis, alis fuscis, anticis chalybeo-cinereo quinque-fasciatis.—*Var.* Fronte facieque nigris.

Female. Ferruginous. Vertex, front and face very narrow, with elevated black dotted borders. Wings brown; fore wings with five incomplete grey bands, which are shining and have a chalybeous tinge; veins black, ferruginous towards the base.—*Var.* Front and face black, with ferruginous borders. Length of the body 2 lines; of the wings $5\frac{1}{2}$ lines.

41. *CIXIUS TRAHENS*, n. s., mas. Niger, subtus ferrugineus, capite perangusto lateribus elevatis, pedibus ferrugineis, alis nigricantibus, venis nigris.

Male. Black, ferruginous beneath. Vertex, front and face very narrow, with elevated borders. Legs ferruginous. Wings blackish; veins black. Length of the body $1\frac{1}{2}$ line; of the wings 4 lines.

42. *CIXIUS PALLENS*, n. s., mas. Testaceus, capite sat lato, vertice brevi, fronte longi-subquadrata, facie lanceolatâ, alis hyalinis, anticis subtestaceis, venis pallidis, areolis basalibus longissimis, discalibus nullis, marginalibus sat longis.

Male. Testaceous. Head moderately broad, with elevated borders; vertex very short; front and face with a middle keel, the former elongate-quadrate, the latter lanceolate. Wings hyaline, with pale veins; fore wings with a slight testaceous tinge, and with only one row of transverse veinlets; basal areolets very long; marginal areolets moderately long, some of their veins forked. Length of the body $1\frac{1}{4}$ line; of the wings 4 lines.

43. *CIXIUS FINIUS*, n. s., fem. Testaceus, capite thorace pedibusque testaceis, vertice transverso, fronte longi-subquadrata, facie lanceolatâ, alis nigro-fuscis albo guttatis, anticis latis, venulis transversis vix ullis, venis marginalibus versus costam flexis.

Female. Testaceous. Head with an elevated border; vertex transverse; front and face with a very slight keel; front elongate-subquadrate; face lanceolate. Wings blackish-brown, with several whitish hyaline spots in the disk and along the exterior border; fore wings broad; veins black, ferruginous at the base, mostly simple; subcostal marginal veins curved; only one transverse veinlet. Length of the body 2 lines; of the wings 6 lines.

44. *CIXIUS DILECTUS*, n. s., mas et fœm. Testaceus, *C. finiti* structurâ, alis hyalinis, anticis latis fusco subfasciatis, venis nigris basi testaceis.

Like *C. finitus* and *C. nexus* in structure. *Male* and *Female*. Testaceous. Wings quite hyaline; veins black, testaceous at the base; fore wings broad, with some irregular and incomplete pale brown bands. Length of the body $1\frac{1}{4}$ line; of the wings 4 lines.

45. *CIXIUS DOTATUS*, n. s., mas et fœm. Nigricans, facie pectore pedibusque albidis, alis fuscis, anticis basi fasciâ latâ interiore maculis quinque exterioribus apiceque hyalinis, stigmate fusco, posticis basi latè hyalinis.

Male and *Female*. Blackish. Face, pectus and legs whitish. Vertex short; front and face with a middle keel; front elongate-subquadrate, with whitish elevated borders; face lanceolate. Wings brown; fore wings with the base, a broad band, five exterior dots and the tips hyaline; veins black, several of them forked; one row of transverse veinlets; stigma black; hind wings hyaline for nearly one-third of the length from the base. Length of the body 1 line; of the wings $3\frac{1}{2}$ lines.

46. *CIXIUS INSUETUS*, n. s., mas. Testaceus, fronte facieque longis perangustis, alis hyalinis albo tomentosus, venis albis.

Male. Testaceous. Head with an elevated border, transverse above; front and face long and very narrow, with a slight middle keel. Wings hyaline, but thickly covered with white tomentum; veins white, much like those of *C. dilectus* in structure. Length of the body $\frac{3}{4}$ line; of the wings 3 lines.

Gen. BIDIS, Walk.

47. *BIDIS PICTULA*, n. s., mas et fœm. Viridis rufo nigroque vittata, verticis apice, pectoris maculis duabus abdomineque nigris, alis hyalinis, anticis strigâ apicali guttisque marginalibus fuscis, venis nigris albo fasciatis.

Male and *Female*. Green, with red and black stripes. Head with much elevated borders; vertex narrow in front, black at the tip; front and face narrow and very long, with red disks. Antennæ long, filiform; 2nd joint much longer than the 1st; seta much longer than the 2nd joint. Pectus with two black spots. Abdomen black. Wings hyaline, with brown marks along the borders, and with a brown streak which extends from two-thirds of the length to the tip; veins black, with white bands. Length of the body 3 lines; of the wings 7 lines.

48. *BIDIS PUNCTIFRONS*, n. s., mas et fœm. Testacea rufo vittata, fronte nigro punctatâ, thoracis carinis pallidioribus, alis subhyalinis, anticis guttis marginalibus strigâque apicali dilatatâ fuscis, venis nigris testaceo fasciatis.

Male and *Female*. Testaceous, with red stripes, in structure like *B. pictula*. Front with three rows of black transverse dots; face with black dots at the base. Thorax with three brown stripes. Wings nearly hyaline; fore wings with marginal brown dots, and with an irregular brown streak, which is dilated towards the tip of the wing; veins black, with testaceous bands. Length of the body $3-3\frac{1}{4}$ lines; of the wings $7-7\frac{1}{2}$ lines.

49. *BIDIS CONTIGUA*, n. s., mas. Testacea, rufo vittata, fronte nigro punctatâ, alis subhyalinis, anticis vittâ posticâ nigrâ, venis testaceis.

Male. Testaceous : in structure like *B. pictula*. Head and thorax with red stripes. Front with three rows of black transverse dots. Prothorax with black dots on each side. Mesothorax with three pale brown stripes. Wings nearly hyaline ; fore wings with a black stripe along the interior border ; veins testaceous. Length of the body 3 lines ; of the wings 7 lines.

Gen. OSTAMA, n. g.

Caput breve ; vertex subquadratus lateribus subelevatis ; frons plana, longi-subquadrata, antice latior ; facies lanceolata. *Antennæ* longiusculæ, filiformes ; articulus 2^{us} 1^o non longior ; seta brevis. *Mesothorax* tricarinatus. *Alarum* anticarum arcolæ basales marginalibus multò longiores ; venæ marginales plurimæ, nonnullæ furcatae.

Head short ; vertex subquadrate, with elevated borders ; front smooth, elongate-subquadrate ; face lanceolate, a little shorter than the front. *Antennæ* filiform, rather long ; 2nd joint as long as the 1st ; seta short. *Mesothorax* with three slight parallel keels. Fore wings with a row of transverse veinlets which divides the basal veins from the marginal veins, the former nearly twice the length of the latter, which are rather numerous, and some of them forked.

50. *OSTAMA JUNCTA*, n. s., mas. Ferruginea subtùs nigra, abdominis dorso tibiisque rufis, alis anticis fuscis testaceo conspersis, apices versus hyalinis vittâ arcuatâ strigâque nigro-fuscis, posticis cinereis.

Male. Ferruginous, black beneath. Borders of the thorax testaceous. Abdomen above and tibiæ red. Fore wings brown, with numerous testaceous punctures ; part beyond the transverse veinlets hyaline, with a curved stripe and a streak of a blackish-brown hue ; hind wings grey. Length of the body 2½ lines ; of the wings 7 lines.

Gen. ERANA, n. g.

Caput lateribus elevatis carinâque mediâ ; vertex subconicus ; frons subquadrata, faciem versus latior ; facies lanceolata. *Antennæ* longæ, validæ, filiformes ; articulus 1^{us} brevis ; 2^{us} longus ; seta nulla. *Mesothorax* carinis tribus parallelis. *Alarum* anticarum arcoke basales discalibus et marginalibus triplo longiores ; venulæ transversæ costales paucæ perobliquæ.

Head with elevated borders and with a middle keel ; vertex nearly conical ; front elongate-subquadrate, broader towards the face which is lanceolate. *Antennæ* elongated, stout, filiform ; 1st joint short ; 2nd long ; no arista. *Mesothorax* with three parallel keels. Fore wings with the basal arcolelets full thrice longer than the discal and marginal arcolelets together ; the marginal arcolelets as long as the discal arcolelets and not more numerous ; costal transverse veinlets few and very oblique.

51. *ERANA OPEROSA*, fœm. Ferruginea ; alis anticis apud venas chalybeo notatis, posticis nigricantibus.

Female. Ferruginous. Fore wings with chalybeous spangles on the veins ; hind wings blackish. Length of the body 2½ lines ; of the wings 6 lines.

Gen. RHOTALA, n. g.

Caput suprà conicum, lateribus elevatis, fronte facieque planis, elongatis, punctulatis. *Antennæ* breviusculæ, filiformes; articulus 2^{us} 1^o longior; arista longa, gracilis. *Prothorax* sat magnus; areâ mediâ conicâ, tricarinatâ. *Alæ* antice areolis basalibus longissimis, venulis transversis plurimis exterioribus nonnullisque costalibus.

Vertex conical, with elevated borders; front and face forming a fusiform compartment which is flat and punctured. *Antennæ* cylindrical, rather short; arista long, slender. *Prothorax* well developed; middle part conical, with three keels. Fore wings with very long basal areolets, and with several transverse veinlets on the marginal areolets; exterior part of the costa with some oblique parallel veinlets.

52. RHOTALA DELINEATA, n. s., mas et fœm. Testacea, vertice thorace alisque anticis crebrè ferrugineo conspersis, fronte facie pectoreque nigris, pedibus ferrugineis nigro variis, anticis testaceo fasciatis, alis posticis nigricantibus.

Male and *Female*. Testaceous. Vertex, thorax and fore wings thickly covered with ferruginous dots. Fore wings with three short black streaks forming an oblique transverse line. Head beneath and pectus black. Legs ferruginous, with black marks; fore legs with testaceous bands. Hind wings blackish. Length of the body 4 lines; of the wings 10 lines.

Trib. ISSITES, *Spinola*.Gen. ISSUS, *Fabr.*

53. ISSUS PRECEDENS, n. s., fœm. Piceus, capitis lateribus elevatis, vertice longi-subquadrato, fronte anticè dilatatâ testacè, pectore pedibusque testaceo notatis, alis anticis nitentibus testaceo subobsoletè guttatis, posticis nigricantibus.

Nearly allied to *I. sinensis*. *Female*. Piceous. Head with elevated borders; vertex elongate-subquadrate; front broader and testaceous in front. Pectus and legs with testaceous marks. Fore wings shining, with indistinct testaceous dots. Hind wings blackish. Length of the body 3 lines; of the wings 6 lines.

54. ISSUS COMPOSITUS, n. s., mas. Obscurè testaceus, capite thorace alisque anticis nigro confertissimè conspersis, capitis lateribus elevatis, vertice transverso, fronte tricarinatâ, alis anticis latis plagâ nigrâ submarginali, angulo inferiore acuto, posticis cinereis.—*Var.* Alis anticis pallidioribus plagâ nullâ.

Male. Dull testaceous. Head, thorax and fore wings thickly sprinkled with black. Head with elevated borders; vertex transverse; front with three keels, slightly broader in front. Legs with a few black marks. Fore wings broad, with a black patch near the interior border; interior angle prominent, almost acute; hind wings grey.—*Var.* Fore wings paler, with no black patch. Length of the body 4 lines; of the wings 8 lines.

55. ISSUS RETRACTUS, n. s., mas. Piceus latus, capitis lateribus elevatis fulvis, vertice transverso, fronte latâ, carinâ mediâ subobsoletâ carinâque

transversâ posticâ, facie, mesothoracis disco pedibusque fulvis, alis anticis non angulatis, posticis nigro-cinereis.

Male. Picceous, broad. Head with elevated tawny borders; vertex much broader than long; front hardly longer than broad, very slightly broader in front, with a slight middle keel and a more distinct transverse keel towards the vertex; face, disk of the mesothorax and legs tawny. Fore wings not angular, conical towards the tips; hind wings blackish grey, with many transverse veinlets. Length of the body 3 lines; of the wings 6 lines.

56. *ISSUS FURTIVUS*, n. s., fœm. Cervinus, capitis lateribus elevatis, vertice subquadrato, fronte anticè latiore lateribus tuberculatis concavis carinâ mediâ subobsoletâ, alis anticis fusco variis non angulatis, posticis nigro-cinereis.

Female. Fawn-colour. Head with elevated borders; vertex a little longer than broad, indented behind with a corresponding angle in front; front elongate-subquadrate, broader towards the face, with concave minutely tuberculated sides and with a nearly obsolete middle keel. Fore wings with various brown marks, not angular; hind wings blackish-grey. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

57. *ISSUS PATULUS*, mas. Picco-ferrugineus, capite testaceo, marginibus elevatis, vertice parvo quadrato, fronte longâ carinâtâ anticè latiore, pedibus fulvis, alis posticis nigro-cinereis.

Male. Pitchy ferruginous. Head testaceous, with elevated borders; vertex small, quadrate; front more than twice longer than broad, a little broader towards the face, with a distinct middle keel. Legs tawny. Hind wings blackish-brown. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

58. *ISSUS INERS*, mas. Picco-ferrugineus, capite fulvo lateribus testaceis, marginibus elevatis, fronte longâ carinâtâ anticè dilatâtâ, pedibus fulvis, alis posticis nigro-cinereis.

Male. Pitchy ferruginous. Head tawny, with elevated borders; sides testaceous; vertex small, quadrate, dilated towards the face, with a distinct middle keel. Legs tawny. Hind wings blackish-grey. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

59. *ISSUS GRAVIS*, n. s., mas. Ferrugineus, capitis marginibus elevatis, vertice conico, fronte carinâtâ obconicâ, facie transversâ disco nigricante, alis anticis venulis transversis nullis, posticis subhyalinis, venis venulisque perpancis.

Male. Ferruginous. Head with elevated borders; vertex conical, with a brown mark on each side; front obconical, with a distinct middle ridge and a slight oblique ridge on each side; face transverse, blackish, with a testaceous border. Legs tawny, with some ferruginous marks. Fore wings with no transverse veinlets; hind wings subhyaline, with very few veins and veinlets. Length of the body 3 lines; of the wings 6 lines.

60. *ISSUS ARCTATUS*, n. s., fœm. Ferrugineus, capitis marginibus elevatis, vertice transverso, fronte carinâtâ subquadrâtâ anticè latiore, facie carinâtâ brevi-lanceolatâ, pedibus testaceis, alis posticis cinereis.

Female. Ferruginous. Head with elevated borders; vertex much broader

than long; front a little longer than broad, slightly wider in front, with a slight keel; face keeled, short-lanceolate. Legs testaceous. Hind wings grey. Length of the body 3 lines; of the wings 7 lines.

61. *ISSUS SOBRINUS*, n. s., mas. Fulvus, capitis lateribus albidis, marginibus elevatis, vertice transverso minino, fronte longâ carinatâ anticè latiore, facie lanceolatâ carinatâ, alis posticis nigro-cinereis.

Male. Tawny. Head with whitish sides and elevated borders; vertex transverse, very small; front twice longer than broad, slightly widening in front, with a distinct keel; face keeled, lanceolate. Hind wings blackish-grey. Length of the body 2 lines; of the wings 5 lines.

62. *ISSUS OVALIS*, n. s., mas. Sordidè testaceus, capite latissimo lateribus elevatis, vertice transverso punctis duobus nigris, fronte transversâ carinatâ, alis anticis plagâ costali sordidè albidâ, posticis nigro-cinereis.

Male. Dingy testaceous. Head very broad; vertex, front and face transverse, with elevated borders; vertex twice broader than long, with a minute black dot on each side in front; front and face with a slight keel, the former a little broader than long, the latter lanceolate. Fore wings with a dingy whitish patch by the middle of the costa; hind wings blackish-grey. Length of the body 2 lines; of the wings 5 lines.

63. *ISSUS LITEROSUS*, n. s., mas. Testaceus, capitis marginibus elevatis, vertice transverso, fronte quadratâ carinatâ, carinâ transversâ guttisque duabus posticis, facie lanceolatâ, alis anticis nigro plagiatis, posticis fusco-cinereis.

Male. Testaceous. Head with elevated borders; vertex much broader than long; front subquadrate, with a slight middle keel, and a more distinct transverse keel near the vertex, where there is a black dot on each side; face lanceolate. Fore wings with a few black patches; hind wings brownish-grey. Length of the body 3 lines; of the wings 6 lines.

64. *ISSUS LINEATUS*, n. s., mas. Testaceus nigro varius, capitis marginibus elevatis, vertice conico depresso, fronte longâ subearinatâ anticè latiore, facie lanceolatâ, abdominis dorso rufo, segmentis testaceo marginatis, alis testaceo reticulatis, anticis nigro-fuscis, posticis rufescentibus.

Male. Testaceous, with black marks. Head with elevated borders; vertex conical, depressed, with a black spot on each side; front twice longer than broad, with a slight middle keel, much wider towards the face which is lanceolate. Abdomen red above; hind borders of the segments testaceous. Wings with testaceous veins and veinlets, the latter numerous; fore wings blackish-brown; hind wings reddish. Length of the body 4 lines; of the wings 8 lines.

Gen. *HIRACIA*, n. g.

Corpus ellipticum, convexum. *Caput* marginibus vix elevatis; vertex conicus, tricarinatus; frons faciesque carinis tribus vix conspicuis, hæc lanceolata, illa obeonica anticè excavata. *Prothorax* transversus, quinque-carinatus, anticè angustior. *Mesothorax* trigonus, tricarinatus, apice acutus. *Alæ* anticæ venis venulisque transversis plurimis elevatis, apice acuminatæ.

Body elliptical, convex. Head with the borders hardly elevated; vertex conical, with three distinct keels; front and face with three indistinct keels, the former obconical, excavated next the face, which is lanceolate. Prothorax full twice broader than long, narrower in front, with five keels. Mesothorax triangular, acuminate, with three keels. Fore wings acuminate, with numerous rugulose veins and transverse veinlets.

65. *HIRACIA IGNAVA*, n. s., fœm. Cervina, verticis apice nigro, pedibus et alis anticis nigro guttatis, alis posticis nigricantibus.

Female. Fawn-colour. Vertex black at the tip. Legs and fore wings with a few black dots. Hind wings blackish. Length of the body 5 lines; of the wings 10 lines.

Gen. *HEMISPILÆRIUS*, *Schaum*.

66. *HEMISPILÆRIUS NIGER*, n. s., mas et fœm. Niger nitens subtus fulvescens aut testaceus, alis anticis confertissimè cribratis, posticis nigrocinereis.

Male and Female. Black, shining, tawny or testaceous beneath. Fore wings thickly covered with minute punctures; hind wings blackish-grey. Length of the body 1-1½ line; of the wings 3-3½ lines.

67. *HEMISPILÆRIUS TYPICUS*, n. s., mas. Testaceus, alis anticis fusco bifasciatis, fasciâ 2â arcuatâ, posticis subcinereis.

Male. Testaceous. Fore wings with two brown bands, the hind one undulating; hind wings greyish. Length of the body 1 line; of the wings 3 lines.

68. *HEMISPILÆRIUS TORPIDUS*, n. s., mas. Testaceus nitens, alis anticis confertissimè cribratis, posticis subcinereis.

Male. Testaceous, shining. Fore wings thickly covered with very minute punctures; hind wings greyish. Length of the body ¾-1 line; of the wings 2½-3 lines.

Gen. *EURYBRACHYS*, *Guérin*.

69. *Eurybrachys insignis*, *Westw. Ann. Nat. Hist.* 1842, 119; *Hope, Trans. Linn. Soc.* xix. 134. 27. pl. 12. f. 9.

Inhabits also Mailla. *E. multicolor*, p. 88, may be a variety of this species.

70. *EURYBRACHYS CONSERVA*, n. s., fœm. Testacea, capite truncato-conico, fronte obconicâ subearinatâ sulco antico transverso, facie basi sulcatâ, prothorace vittis duabus obliquis nigris, alis anticis reticulatis nigro variis costâ dilatatâ, posticis albis.

Closely allied to *E. tuberculosa*? *Female*. Testaceous. Head above truncate-conical; front obconical, with a short keel behind and with a transverse furrow in front; face lanceolate, with a short furrow behind. Prothorax with two black oblique stripes. Fore wings with various black marks, reticulated with numerous transverse veinlets, slightly tuberculated; costa dilated, with very numerous transverse veinlets; hind wings white. Length of the body 7 lines; of the wings 16 lines.

71. *EURYBRACHYS VETUSTA*, n. s., fœm. Viridescens subtùs testacea, capite truncato-conico, fronte obconicâ carinatâ, facie carinatâ, mesothorace fusco notato, alis anticis reticulatis, posticis subemercis.

Female. Pale dull green, testaceous beneath. Head above truncate-conical; front elongate-obconical, with a keel, which does not extend to the fore border; face lanceolate, with a keel in front. Mesothorax with some brown marks on each side. Fore wings reticulated with numerous transverse veinlets, slightly tuberculated; costa slightly dilated, with very numerous transverse veinlets; hind wings pale greyish. Length of the body 5 lines; of the wings 14 lines.

72. *EURYBRACHYS INTERCEPTA*, n. s., mas. Pallidè viridis subtùs testacea, capite brevi-conico subtùs lanceolato plano lateribus elevatis, alis anticis strigâ basali guttisque duabus apud marginis interioris apicem nigris, posticis albidis.

Male. Pale green, testaceous beneath. Head above short-conical; front and face together lanceolate and with elevated borders, but not keeled. Fore wings with a black basal streak and with two black dots near the end of the interior border. Hind wings whitish. Length of the body $3\frac{1}{2}$ lines; of the wings 9 lines.

73. *EURYBRACHYS SURRECTA*, n. s., mas. Pallidè cervina subtùs pallidè testacea, capite lateribus elevatis, vertice conico carinato, fronte facieque planis, illâ lineari, alis anticis maculâ basali guttisque duabus discalibus exterioribus nigris, costâ undulatâ, posticis albis.

Male. Pale fawn-colour, pale testaceous beneath. Head with elevated borders; vertex conical, with a middle keel; front and face not keeled, the former linear. Fore wings with a black basal spot, and with two black discal dots; costa undulating; hind wings white. Length of the body $3\frac{1}{2}$ lines; of the wings 9 lines.

Subtrib. FLATOÏDES, *Spinola*.

Gen. FLATOÏDES, *Guérin*.

74. *Flatoïdes guttatus*, *Walk. Cat. Homopt.* pt. 2. 408. 9.
Inhabits also China.

75. *Flatoïdes marginalis*, *Walk.* See page 89.

76. *Flatoïdes discalis*, *Walk.* See page 89.

77. *FLATOÏDES VETERATOR*, n. s., mas. Niger, capite thoracisque lateribus testaceis, alis anticis apud margines nitentibus, fasciâ interiore plagâque exteriore cinereis, guttâ discali atrâ, posticis nigro-cupreis.

Male. Black. Head and sides of the thorax testaceous. Fore wings shining about the borders, with an inner cinereous band, and an outer cinereous patch, the latter including a deep black dot. Hind wings blackish cupreous. Length of the body 4 lines; of the wings 10 lines.

78. *FLATOÏDES POSTERUS*, n. s., mas. Picens, pedibus fulvis, alis nigricantibus, anticis apud marginem interiorum nigro-fuscis, fasciâ brevi anticâ strigisque duabus marginalibus hyalinis.

Male. Picceous. Legs tawny. Wings blackish; fore wings blackish-brown

about the interior border, with a hyaline band extending from the middle of the costa to the disk, and with two marginal hyaline streaks. Length of the body 3 lines; of the wings 8 lines.

79. *FLATOIDES LIMITARIS*, n. s., mas. Piccus subtus testaceus, alis anticis apud margines nitentibus, plagâ cinereâ maculâque nigrâ discalibus, maculâ costali albâ.

Male. Piceous; under side and legs testaceous. Thorax with three keels. Fore wings shining about the borders; middle of the disk cinereous, and including a black spot; a white spot on the middle of the costa. Length of the body 3-4 lines; of the wings 8-10 lines.

80. *FLATOIDES STUPIDUS*, n. s., fœm. Fulvus subtus testaceus, alis nigro-æneis, apud margines nitentibus, anticis guttis duabus (unâ costali, alterâ subcostali) albidis, subapicali nigrâ.

Female. Tawny, testaceous beneath. Wings blackish æneous, shining about the borders; fore wings with a black subapical dot, with two indistinct whitish dots, one costal, the other subcostal. Length of the body 3 lines; of the wings 8 lines.

This species and the preceding and *F. veterator* are very closely allied.

Gen. RICANIA, Germar.

81. *RICANIA OSMYLOIDES*, n. s., mas. Testacea, capite thoraceque nigro maculatis, alis hyalinis, anticis maculis marginalibus fasciisque duabus incompletis nigris, stigmatibus albidis, posticis nigro marginatis.

Male. Testaceous. Vertex arched, with two black stripes; front with five black stripes, the middle one and the exterior pair shortened in front; four spots in front and the borders also black; face with a black stripe. Prothorax with two black stripes; mesothorax with eight black spots. Wings hyaline, with two incomplete black bands; veins black; fore wings with black marginal spots, and with a whitish stigma; hind wings with black borders. Length of the body 4 lines; of the wings 12 lines.

82. *RICANIA SUBACTA*, n. s., fœm. Testacea, fronte carinatâ, abdominis apice nigro nitido, alis hyalinis nigro-venosis, anticis stigmatibus nigris.

Female. Testaceous. Head with elevated borders; vertex arched; front with a middle keel. Abdomen black and shining at the tip. Wings hyaline; veins black; fore wings with a black stigma. Length of the body 3 lines; of the wings 8 lines.

Gen. BENNA, Walk.

83. *BENNA CANESCENS*, n. s., mas et fœm. Testacea, capitis marginibus elevatis, fronte facieque perangustis, halteribus apice albis, alis subcinereis, anticis guttâ basali nigrâ, stigmatibus albidis.

Male and Female. Testaceous. Head with elevated borders; front and face very narrow. Halteres with white tips. Wings very pale cinereous; veins blackish, testaceous at the base; fore wings with a black basal dot and with a whitish stigma, their transverse veinlets fewer than those of *B. capitulata*. Length of the body 3 lines; of the wings 8 lines.

84. *BENNA CLARESCENS*, n. s., mas. Testacea, halteribus apice albis, alis subeivereis, anticis extùs albido lituratis, fasciâ interiore fuscâ.

Male. Testaceous; like the preceding species in structure. Halteres with white tips. Wings greyish; fore wings with a brown band before the middle, and with exterior whitish marks; veins testaceous. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines.

85. *BENNA PRESTANS*, n. s., fœm. Ferruginea subtùs fulva, alis subhyalinis, anticis triente basali ferrugineâ fusco marginatâ.

Female. Ferruginous, tawny beneath; like the two preceding species in structure. Wings nearly hyaline; third part from the base of the fore wings ferruginous with a brown border; veins testaceous. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines.

Gen. SERIDA, n. g.

Caput subascendens, lateribus elevatis angulum acutum utrinque fingentibus; vertex linearis; frons angusta, carinata, anticè dilatata; facies lanecolata, subcarinata. *Thorax* tricarinatus. *Alæ* anticæ angulis rotundatis, venulis costalibus venisque marginalibus plurimis.

Head slightly ascending, with elevated borders, forming a slightly acute angle on each side in front of the vertex which is linear; front narrow, with a distinct keel, widening towards the face which is lanecolate, and has a slight keel. Thorax with three slight keels. Fore wings moderately broad, with rounded angles; marginal veins and costal veinlets very numerous, the latter oblique and parallel.

86. *SERIDA LATENS*, n. s., mas. Fulva, frontis lateribus basi prothoraceque nigro guttatis, alis anticis guttis paucis discalibus costâ lineisque transversis exterioribus nigricantibus, apice cinereo-hyalinis lineolis duabus obliquis nigricantibus.

Male. Tawny. Sides of the front at the base and prothorax with black dots. Fore wings with the costa, some discal spots, and some exterior transverse lines blackish; tips cinereous hyaline, with two short oppositely oblique black lines. Length of the body 4 lines; of the wings 10 lines.

87. *SERIDA FERVENS*, n. s., mas. Fulva, fronte viridi sat latâ, marginibus carinâque fulvis, alis apice fuseis, anticis fusco bifasciatis.

Male. Tawny. Front green, moderately broad, with the borders and the keel tawny. Wings with brown tips; fore wings with two brown bands, one near the base, the other oblique irregular and beyond the middle. Length of the body 3 lines; of the wings 8 lines.

This species differs much in the structure of the front from *S. latens*, which is the type of the genus.

Gen. PARICANA, n. g.

Caput læve, planum; vertex brevis; frons longi-subquadrata; facies lanecolata. *Antennæ* aristâ longâ gracili. *Thorax* tricarinatus. *Alæ* anticæ apice late rotundatæ, areolis mediis et marginalibus longitudine subæqualibus.

Head smooth, not keeled nor with elevated borders; vertex short; front

elongate-subquadrate; face lanceolate. Antennæ with a long and slender arista. Thorax with three keels. Fore wings broad and rounded towards the tips; basal areolets about half the length of the wing; middle and apical areolets of nearly equal length; a few oblique costal transverse veinlets beyond the middle.

88. *PARICANA DILATIPENNIS*, n. s., fœm. Testacea, fronte facie apice pectorisque fasciâ nigris, alis hyalinis, anticis fasciis duabus (unâ basali, alterâ mediâ) fuscis.

Female. Testaceous. Head shining; front and tip of the face black. Pectus with a black band. Wings hyaline; veins black, tawny at the base; fore wings with a black band near the base and another across the middle. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines.

Gen. NICERTA, n. g.

Corpus gracile. Caput compressum, perangustum; vertex lateribus valdè elevatis; frons cultriformis; facies lanceolata. *Antennæ* articulo 2º longo, cylindrico. *Alæ* angustæ; anticæ venis paucis, venulis nonnullis transversis exterioribus posterioribus.

Body slender. Head much compressed, very narrow; vertex with the borders much elevated; front forming an acute edge; face lanceolate. Antennæ with the 2nd joint long and cylindrical. Wings narrow; fore wings with few veins; hind part beyond the middle with some transverse veinlets.

89. *NICERTA SUBMENTIENS*, n. s., mas. Albida, oculis fulvis, alis albo-hyalinis, venis albis.

Male. Whitish. Eyes tawny. Wings whitish hyaline; veins white. Length of the body 3 lines; of the wings 7 lines.

90. *NICERTA FLAMMULA*, n. s. Lætè et saturatè rosea, tarsis albidis.

Very bright rosy-red. Tarsi whitish. Length of the body $1\frac{1}{2}$ line; of the wings 5 lines.

91. *NICERTA FERVENS*, n. s. Testacea, capite elongato strigis rufis, alis anticis rufis hyalino guttatis, posticis hyalinis.

Testaceous. Head much elongated, conical when viewed laterally, streaked with red. Fore wings red, with very numerous hyaline spots. Hind wings hyaline. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines.

Gen. EUCARPIA, n. g.

Caput breve, marginibus valdè elevatis; vertex transversus, subquadratus; frons et facies carinatæ, hæc lanceolata, illa subquadrata. *Thorax* brevis, bicarinatus. *Pedes* breves, tenues. *Alæ* angustæ; anticæ arcolis discalibus perpaucis, marginalibus plurimis.

Head short, with the borders much elevated; vertex and front subquadrate, the former transverse; front and face keeled, the latter lanceolate. Thorax short; scutum with two parallel keels. Legs short, slender. Wings narrow. Fore wings slightly widening from the base to the tips which are rounded; discal areolets very few; marginal areolets large, numerous.

92. *EUCARPIA UNIVITTA*, n. s. Ferruginea subtus testacea, capitis thoracisque

carinis pedibusque testaceis, alis anticis fuscis, disco margineque tenui flavis, posticis cinereo-hyalinis.

Ferruginous, testaceous beneath. Borders and keels of the head and of the thorax and legs testaceous. Fore wings brown; the middle of the disk and a slender stripe along the border yellow. Hind wings greyish hyaline. Length of the body $1\frac{1}{4}$ line; of the wings 4 lines.

Gen. RHOTANA, n. g.

Capitis vertex cultriformis; frons trigona; facies lanceolata. *Prothorax* brevissimus. *Mesothorax* carinis duabus vix conspicuis, lateribus elevatis. *Alæ* latæ; anticæ venis venulisque transversis paucis.

Vertex of the head forming a sharp edge; front triangular, acuminate towards the vertex; face lanceolate. Prothorax very short. Mesothorax with elevated borders and with two indistinct keels. Wings broad; fore wings with a few veins, some of which are forked, and with only one line of transverse veinlets.

93. RHOTANA LATIPENNIS, n. s., mas. Testacea, capitis margine rufo, alis hyalinis, anticis cervino nebulosis maculâ posticâ subapicali nigrâ, posticis maculâ magnâ apicali nigrâ.

Male. Testaceous. Head red along the edge. Wings hyaline; veins testaceous; fore wings slightly clouded with fawn-colour, with a black posterior subapical spot; hind wings with a large black apical spot. Length of the body 2 lines; of the wings 5 lines.

Gen. POCHAZIA, *Amyot et Serv.*

94. Pochazia fumata, *Amyot*. See page 91.

95. POCHAZIA CONVERGENS, n. s., mas. Nigra, fronte latissima, abdominis apice albo floccoso, alis anticis vittâ discali areuatâ hyalinâ, posticis hyalinis ex parte nigro marginatis.

Male. Black. Front very broad. Abdomen with white flecks at the tip. Fore wings with a curved hyaline discal stripe which is attenuated at each end; hind wings hyaline, bordered with black except along the costa and at the tips. Length of the body 4 lines; of the wings 15 lines.

Gen. NEPHEA, *Amyot et Serv.*

96. NEPHEA GRATA, n. s. Pallidè viridis, pedibus testaceis, alis anticis purpureo marginatis angulo exteriore rotundato interiore acutiore, posticis albis.

Pale green. Legs testaceous. Fore wings with narrow purple borders; apical angle rounded; interior one rectangular, well defined; hind wings white. Length of the body 4-5 lines; of the wings 12-14 lines.

97. NEPHEA GUTTULARIS, n. s. Pallidè testacea, alis albis, anticis nigro guttatis angulo exteriore rotundato interiore subobtusos.

Pale testaceous. Wings white; fore wings with about eighteen black dots; apical angle rounded, interior one slightly obtuse. Length of the body 3 lines; of the wings 10 lines.

98. *NEPHESA VOLENS*, n. s. Pallidè testacea, alis anticis subobsoletè luteo marginatis angulo exteriore rotundato interiore subobtusato, posticis albis.

Pale testaceous. Fore wings indistinctly bordered with luteous; apical angle rounded; interior one slightly obtuse. Length of the body 3 lines; of the wings 9 lines.

99. *NEPHESA LUTEA*, n. s. Lutea, alis anticis angulo exteriore valdè rotundato interiore producto acuto, posticis albis.

Luteous. Fore wings with fewer veins than those of the three preceding species; apical angle very much rounded; interior one produced, acute. Hind wings white. Length of the body 3 lines; of the wings 8 lines.

100. *Nephesa marginella*, *Guér. Icon. Règne Anim. Ins.* pl. 58. f. 6. *texte*, 359 (Ricania).

Inhabits also Cochinchina.

The acute front of this species distinguishes it from every other in the genus.

101. *NEPHESA DEDUCTA*, n. s. Viridis, alis anticis luteo marginatis, angulis rotundatis, posticis albis.

Green. Fore wings with luteous borders; apical angle much rounded; interior one slightly rounded. Hind wings white. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines.

102. *NEPHESA TRIPARS*, n. s., mas. Viridis subtùs pallida, alis anticis deflexis luteo marginatis angulo exteriore rotundato interiore vix rotundato, posticis albis.

Male. Green, pale green beneath. Fore wings with luteous borders; apical angle rounded; interior one almost rectangular, hardly rounded. Hind wings white. Length of the body 3 lines; of the wings 11 lines.

The fore wings of this species are deflexed in repose, not vertical as in the other species of the genus.

Gen. FLATA, *Fabr.*

103. *Flata obscura*, *Fabr.* See page 92.

Gen. COLOBESTHES, *Amyot et Serv.*

104. *Colobesthes albiplana*, *Walk.* See page 92.

Gen. PÆCILOPTERA, *Latr.*

105. *Pæciloptera circulata*, *Guér. Icon. Règne Anim. texte*, 361.

Inhabits also Java.

106. *Pæciloptera maculata*, *Guér.* See page 92.

Var. More like the Java specimens than those from Malacca, but differing from both.

107. *PÆCILOPTERA RORIDA*, n. s., mas. Testacea subtùs albida, alis anticis subfuscis albo guttatis, vittâ undulatâ pallidissimè purpurascens, margine interiore albedo punctato, posticis albis.

Male. Testaceous, whitish beneath. Abdomen and hind wings white. Fore

wings very pale brown, with many minute white dots, and with a forked, much curved, very pale purplish stripe which includes a spot, and is interrupted along the exterior border; interior border darker, with white points towards the base. Length of the body 5 lines; of the wings 20 lines.

108. *PŒCIOPTERA DEPLANA*, n. s., mas. Pallidè testacea, capite angusto lateribus elevatis, antennis tibiis tarsisque anticis nigris, alis albis, anticis lineis tribus exterioribus nigris fasciisque duabus arcuatis (unâ submarginali, alterâ marginali) fuscis.

Male. Pale testaceous. Head narrow, with the borders much elevated. Antennæ, fore tibiæ and fore tarsi black. Wings white. Fore wings pale testaceous at the base, with three exterior black lines, of which two are by the interior border, and the third is discal, angular, and much longer than the others; two pale brown curved bands, one submarginal, parallel to the other which is marginal. Length of the body 4 lines; of the wings 12 lines.

Gen. *FICARASA*, n. g.

Caput lateribus elevatis; vertex arcuatus; frons subcarinata; lateribus angulatis; facies lanceolata. *Prothorax* valdè arcuatus. *Mesothorax* tricarinatus. *Alæ* antiçæ areolis basalibus longissimis, mediis et marginalibus subæqualibus, venulis plurimis transversis costalibus et exterioribus plurimis.

Head with elevated borders; vertex transverse, arched; front elongate, with a slight middle keel, with a slight groove along each side, and with very obtusely angular borders; face lanceolate. Fore wings rather narrow, rounded towards the tips; basal areolets more than half the length of the wing; marginal areolets very little longer than the middle areolets, several of which are forked; costal veinlets and exterior veinlets numerous, the former oblique and parallel.

109. *FICARASA PALLIDA*, n. s., mas. Pallidè testacea, alis hyalinis, venis testaceo-albidis.

Male. Pale testaceous. Wings hyaline; veins whitish testaceous. Length of the body 3 lines; of the wings 10 lines.

Gen. *EUPILIS*, *Walk.*

110. *Eupilis albilineola*, *Walk.* See page 93, where the length of the wings is erroneously stated to be 7 instead of 12 lines.

111. *EUPILIS HEBES*, n. s., mas et fœm. Testacea, fronte maculis duabus posticis vittæque nigris, vertice thoraceque nigro guttatis, alis subcinereis, venis ferrugineis.

Male and Female. Testaceous. Vertex with two black dots; front with two black spots towards the vertex, and with a black stripe which extends to the face. Thorax with a few black dots. Wings very slightly greyish; veins ferruginous. Length of the body 3-4 lines; of the wings 8-10 lines.

Fam. MEMBRACINA, *Burmeister*.Gen. CENTROTUS, *Fabr.*

112. *Centrotus Taurus*, *Fabr.* See page 93.

113. *CENTROTUS SUBSIMILIS*, n. s., fœm. Niger obscurus, thorace scabro gibboso, cornubus lateralibus rectis acutis, cornu postico abdominis apicem superante, scutello pectorisque maculis duabus albidis, alis subluridis, costâ venisque nigris.

Female. Black. Thorax scabrous, elevated; lateral horns acute, extending at right angles to the body; scutellum, and a spot on each side of the pectus whitish. Wings slightly lurid; costa and veins black. Length of the body 3 lines; of the wings 7 lines.

Very nearly allied to *C. Taurus*, from which it is distinguished by its shorter, straight, and horizontal lateral horns.

114. *Centrotus laminifer*, *Walk.* See page 93.

Exceeding in size the specimen from Malacca.

115. *Centrotus vicarius*, *Walk. Cat. Homopt.* pt. 2. 605.

Inhabits also Java.

116. *CENTROTUS LIMBATUS*, n. s. Niger, thoracis vittis tribus, abdomine subtus pedibusque albidis, cornubus lateralibus parvis, cornu postico abdominis apicem vix attingente.

Black. Thorax with three white stripes which are united in front and behind; the lateral pair curved, including the lateral horns, and dilated at the base of the hind horn; lateral horns acute, as long as half the space between them; hind horn extending nearly to the tip of the abdomen, which is whitish beneath. Legs whitish. Wings greyish hyaline, with black veins. Length of the body $3\frac{1}{2}$ lines; of the wings 8 lines.

117. *CENTROTUS LATIMARGO*, n. s. Ater, thoracis cornubus lateralibus latis planis acuminatis bicarinatis, cornu postico abdominis apicem non attingente, tarsis posticis albidis, alis testaceo-hyalinis, anticis apud costam latè nigris.

Deep black, scabrous. Lateral horns of the thorax broad, flat, acuminate, with two ridges, slightly inclined backward, each as long as the space between them; hind horn extending nearly to the tip of the abdomen. Hind tarsi whitish. Wings testaceous hyaline. Fore wings with a broad black costal stripe. Length of the body 3 lines; of the wings 7 lines.

Nearly allied to *C. Assamensis*, Fairm.

118. *CENTROTUS DENSUS*, n. s., mas. Niger obscurus scabrosus, thoracis cornubus lateralibus acuminatis carinatis subascendentibus, cornu postico abdominis apicem superante, scutello maculis duabus albidis, alis posticis cinereo-hyalinis.

Male. Black, dull, scabrous, stout. Lateral horns of the thorax acute, ridged, obliquely ascending, each a little shorter than the space between them; hind horn extending a little beyond the tip of the abdomen; scutellum

with a whitish spot on each side. Hind wings greyish hyaline. Length of the body $2\frac{3}{4}$ lines; of the wings 7 lines.

119. *CENTROTUS VARIPES*, n. s., fœm. Niger obscurus scabrosus, thorace carinato, cornubus lateralibus acuminatis carinatis subrecurvis, cornu postico brevi, tibiis tarsisque posterioribus albidis, his apice nigris, alis subcinereo-hyalinis, anticis costâ nigrâ.

Female. Black, dull, scabrose. Thorax with a slight keel; lateral horns acute, ridged, slightly curved backward and ascending, each as long as the space between them. Hind tibiæ and hind tarsi whitish, the latter black towards the tips. Wings hyaline, slightly cinereous; veins black; costa of the fore wings black for two-thirds of the length from the base. Length of the body $2\frac{1}{2}$ lines; of the wings 6 lines.

120. *Centrotus caliginosus*, *Walk.* See page 93.

121. *CENTROTUS CICADIFORMIS*, n. s., fœm. Niger obscurus scabrosus, thoracis cornubus lateralibus subobsoletis, cornu postico nullo, abdominis apice suprâ pedibusque fulvis, alis subcinereo-hyalinis, anticis costâ basique nigris.

Female. Black, dull, scabrous. Lateral horns of the thorax almost obsolete; no hind horn. Abdomen tawny towards the base above. Legs tawny. Wings hyaline, slightly greyish; veins black; fore wings black at the base and along the costa. Length of the body $1\frac{3}{4}$ line; of the wings 4 lines.

122. *CENTROTUS CONSOCIUS*, n. s., fœm. Niger obscurus punctulatus, thorace anticè inermi, cornu postico abdominis dimidium superante, pedibus fulvescentibus, alis hyalinis, anticis basi fasciis duabus maculâque subapicali nigris.

Female. Black, dull, minutely punctured. Thorax unarmed in front; hind horn extending to a little beyond half the length of the abdomen. Legs dingy tawny. Wings hyaline; veins pale; fore wings with the base, two irregular bands, and a subapical spot black. Length of the body 1 line; of the wings $2\frac{1}{2}$ lines.

Very nearly allied to *C. semifascia*, *Walk.*

Gen. *MICREUNE*, *Walk.*

123. *Micreune formidanda*, *Walk.* See page 94.

124. *MICREUNE METUENDA*, n. s., mas et fœm. Atra, thoracis maculis duabus lateralibus posticis testaceis, cornu erecto spinis duabus lateralibus acutis subarcuatis, cornu postico abdominis apicem superante, alis cinereo-hyalinis, venis nigris.

Male and Female. Deep black. Thorax with a testaceous spot on each side hindward; the erect horn armed with two acute, horizontal, slightly curved spines; hind horn extending a little beyond the tip of the abdomen. Wings cinereous hyaline; veins black. Length of the body 3 lines; of the wings 5 lines.

C. dama, Germar, and *C. gazella*, Hoffm., probably belong to this genus.

Fam. CICADELLINA, *Burm.*Trib. LÆVIPEDES, *Amyot et Serv.*Subtrib. CERCOPIDES, *St. Farg. et Serv.*Gen. CERCOPIS, *Fabr.*

125. *Cercopis tricolor*, *St. Farg.* See page 94.

126. *Cercopis submaculata*, *Walk. Cat. Homopt.* pt. 3. 657. 27.

Inhabits also Java.

127. *Cercopis flavifascia*, *Walk. Cat. Homopt.* pt. 3. 654. 16.

Inhabits also Java.

128. *Cercopis costalis*, *Walk.* See page 95.

The marks on the thorax and on the fore wings are occasionally white.

129. *Cercopis dorsimacula*, *Walk.* See page 95.

130. *Cercopis rugulosa*, *Walk.* See page 95.

131. *CERCOPIS SEMIPARDALIS*, n. s. Cuprea pubescens, abdomine subtus rufo nigro maculato, pedibus rufis, alis anticis fulvis nigro maculatis apice cupreis, posticis cinereis.

Cupreous, pubescent. Abdomen beneath red, with black spots. Legs reddish. Fore wings tawny, with nine black spots; apical third part cupreous. Hind wings cinereous. Length of the body 5 lines; of the wings 14 lines.

132. *CERCOPIS DELINEATA*, n. s., fœm. Nigro-cyanea pubescens, capitâ vittâ thoracisque fasciâ posticâ flavis, pedibus rufis, alis anticis purpureo-cupreis luteo trivittatis, posticis cinereis.

Female. Blackish, pubescent. Head with a lanceolate yellow stripe in front. Scutum with a curved yellow band. Abdomen tawny beneath. Legs red. Fore wings purplish cupreous, with three luteous bands, one along the basal part of the interior border, the other two at right angles to the costa. Hind wings grey. Length of the body 4 lines; of the wings 10 lines.

133. *CERCOPIS SEMIROSEA*, n. s. Rufo-lutea, alis anticis testaceis basi costâque rufescentibus apice roseis, posticis albidis.

Reddish luteous. Fore wings testaceous, rosy towards the tips, reddish at the base and along the costa. Hind wings whitish. Length of the body 3 lines; of the wings 8 lines.

134. *CERCOPIS UNDULIFERA*, n. s., fœm. Nigra, frontis maculâ thoracis fasciâ et alarum anticarum lineis duabus transversis undulatis testaceis, tibiis tarsisque fulvescentibus, alis posticis cinereis.

Female. Black. Vertex piecous, with a testaceous border; front with a testaceous spot behind. Thorax with a broad testaceous band. Tibiæ and tarsi dark tawny. Fore wings with two undulating transverse testaceous lines. Hind wings cinereous. Length of the body 3 lines; of the wings 8 lines.

135. *CERCOPIS SUBDOLENS*, n. s. Rufa, capite pectore pedibusque nigris, femoribus tibiisque posticis rufis, alis posticis cinereis.

Red. Head, pectus and legs black. Hind femora and hind tibiæ red. Hind wings grey. Length of the body 2 lines; of the wings 6 lines.

Subtrib. APHROPHORIDES, *Amyot et Serv.*Gen. PTYELUS, *St. Farg. et Serv.*136. *Ptyelus amplus*, *Walk. Cat. Homopt.* pt. 3. 706. 11.

Inhabits also Java.

137. *PTYELUS INEFFECTUS*, n. s., fœm. Piceus, tibiis posticis fulvis, alis anticis lineâ transversâ angulosâ subobsoletâ fulvâ, posticis nigro-cinereis.*Female.* Piceous. Pectus with a tawny spot on each side. Hind tibiæ dull tawny. Fore wings with an indistinct transverse zigzag tawny line. Hind wings blackish-grey. Length of the body $3\frac{1}{2}$ lines; of the wings 8 lines.

Gen. AMARUSA, n. g.

Corpus longum. *Caput* breve, arcuatum, lateribus vix brevioribus; frons sulcis transversis. *Scutum* anticè impressum, margine postico excavato; scutellum oblanceolatum. *Pedes* brevissimi. *Ala* longi-fusiformes.

Body long. Head short, convex in front, concave behind, hardly longer in the middle than on each side; its breadth more than four times its length. Scutum impressed in front; middle part of the hind border excavated; scutellum oblanceolate. Legs very short. Wings elongate-fusiform.

138. *AMARUSA PICEA*, n. s. Nigra, capite suprâ thoraceque obscure fulvis, thorace maculis duabus lateralibus piceis, alis anticis piceis, posticis nigro-cinereis.

Black. Head above and thorax dark tawny. Thorax with a piceous spot on each side. Fore wings piceous. Hind wings blackish-grey. Length of the body 4 lines; of the wings 10 lines.

Gen. PERINOIA, *Walk.*139. *PERINOIA EXCLAMANS*, n. s., fœm. Fusca, capite suprâ thoraceque testaceo septem-vittatis, capite subtùs pectoreque testaceo bivittatis, alis anticis nigro-fuscis vittis tribus basalibus duabusque apicalibus maculisque quatuor intermediis testaceis, posticis cinereis.*Female.* Brown. Head above and scutum with seven testaceous stripes which extend to the scutum and to the interior base of the fore wings. Head beneath and pectus with a testaceous stripe on each side. Fore wings blackish-brown, pale brown like the thorax at the interior base, with three basal and two apical testaceous stripes, and with four intermediate elongated testaceous spots. Hind wings cinereous. Length of the body $3\frac{1}{2}$ lines; of the wings 8 lines.140. *PERINOIA SIGNIFERA*, n. s., fœm. Nigra, capite suprâ thoraceque testaceis cervino sex-vittatis, capite subtùs pectoreque testaceo bivittatis, pedibus testaceis, alis anticis margine interiore vittâ basali arcuatâ vittisque duabus apicalibus testaceis, posticis cinereis.*Female.* Black, narrower than the preceding species, and with a more conical head. Head above and thorax testaceous, with six fawn-coloured stripes

which extend to the scutum and to the interior border of the fore wings. Head beneath and pectus with a testaceous stripe on each side. Legs testaceous. Fore wings with the interior border, a curved basal stripe, and two apical stripes testaceous. Hind wings cinereous. Length of the body 3 lines; of the wings 6 lines.

141. *PERINOIA EXPRESSA*, n. s., fœm. Nigra, capite subtus pectoreque albido bivittatis, ventre pedibusque obscure fulvis, alis anticis maculis duabus strigâque exteriore subarenatâ albido-testaceis, posticis cinereis.

Female. Black. Head piceous above; under side and pectus with a whitish stripe on each side. Abdomen beneath and legs dark tawny. Fore wings with two whitish testaceous spots, and with an exterior somewhat paler slightly curved streak which joins the costa and extends nearly to the tip of the wing. Hind wings blackish-grey. Length of the body $3\frac{1}{2}$ lines; of the wings 8 lines.

Subtrib. *SERRIPEDES*, *Amyot et Serv.*

Coh. *TETTIGONIDES*, *Amyot et Serv.*

Gen. *TETTIGONIA*, *Germar.*

142. *Tettigonia farinosa*, *Fabr.* See page 97.

143. *Tettigonia ferruginea*, *Fabr.* See page 97.

144. *Tettigonia suavissima*, *Walk.* See page 97.

145. *TETTIGONIA ELONGATA*, n. s. Fulva subtus testacea, capitis disco fasciisque duabus anticis neenon senti maculâ anticâ margineque postico scutellique disco nigris, abdomine nigro, margine fasciisque subtus rufis, pedibus albidis, tibiis tarsisque apice nigris, alis anticis ferrugineis basi fulvo nigro glaucoque maculatis apice posticisque nigricantibus.

Tawny, testaceous beneath. Disk of the head and two bands beneath, a spot in front of the scutum and its hind border, and the disk of the scutellum black. Abdomen black; under side with red bands and a red border. Legs whitish; tips of the tibiæ and of the tarsi black. Fore wings ferruginous, blackish towards the tips, with three spots at the base; 1st spot tawny, 2nd black, 3rd glaucous. Hind wings blackish. Length of the body 6 lines; of the wings 14 lines.

146. *TETTIGONIA LINEOLATA*, n. s. Glauco-nigra, capite subtus fasciis duabus flavis, pectoris abdominisque lateribus flavis, ventre subtus fasciâ posticâ flavâ apice albo, pedibus piceis, anticis flavo variis, alis posticis basi cinereis.

Black, with a glaucous tinge. Head beneath with two yellow bands. Pectus and abdomen yellow along each side; the latter with a yellow band near the tip, which is white. Legs piceous; fore legs marked with yellow. Hind wings cinereous hyaline towards the base. Length of the body 6 lines; of the wings 14 lines.

147. *TETTIGONIA ANGULARIS*, n. s. Nigra albo tomentosa subtus picea,

thorace cupreo, vittis obscurioribus guttisque albis, margine antico nigro, alis anticis cupreo-rufis apice cinereis, posticis nigro-cinereis.

Black, with whitish tomentum, piceous beneath. Thorax cupreous, with darker stripes and with white dots, black along the fore border. Fore wings cupreous red, grey towards the tips, with a dotted pale lilac band at the base. Hind wings blackish-grey. Length of the body 5 lines; of the wings 10 lines.

148. *TETTIGONIA INVADENS*, n. s., fœm. Ochracea, tibiis anticis intus nigro lineatis, alis anticis apice posticisque cupreo-cinereis.

Female. Ochraceous. Fore tibiæ with a black line on the inner side. Fore wings at the tips and hind wings cupreous-cinereous. Length of the body 4 lines; of the wings 10 lines.

149. *TETTIGONIA SCITIPENNIS*, n. s., mas. Lætè flava, subtus nigra, abdomine nigro apice albido, pedibus flavis, alis anticis maculis quatuor fasciâque exteriore nigris, apice cinereis, posticis nigro-cupreis apice cinereis.

Male. Bright yellow, black beneath. Abdomen black, whitish at the tip. Legs yellow. Fore wings with four black spots and with an exterior black band, grey at the tips. Hind wings blackish-cupreous, with grey tips. Length of the body $3\frac{1}{2}$ lines; of the wings 8 lines.

150. *TETTIGONIA LEPIDIPENNIS*, mas. Flava, thorace ochraceo-vittato, abdomine pedibusque albidis, alis anticis æneo-testaceis subhyalinis, maculis quinque elongatis ochraceis, posticis albo-hyalinis.

Male. Yellow. Thorax with an ochraceous stripe. Abdomen and legs whitish. Fore wings aneous testaceous, subhyaline, with five elongated irregular ochraceous spots, the subapical one indistinct. Hind wings white, hyaline. Length of the body 4 lines; of the wings 10 lines.

151. *TETTIGONIA EBURNEA*, n. s., mas et fœm. Albida, capite conico, alis lacteo-albis.

Male and Female. Whitish. Vertex of the head conical. Wings milk-white. Length of the body $2\frac{3}{4}$ lines; of the wings 7 lines.

152. *TETTIGONIA SIGNIFERA*, n. s. Æneo-cinerea, capitis maculis quatuor, thoracis vittis duabus alisque anticis vittâ interruptâ rufis, alis posticis cinereis.

Æneous-cinereous. Head conical, with four red stripes. Thorax with two red stripes and a red dot on the hind border between them. Fore wings with a red stripe composed of five streaks. Hind wings greyish-hyaline. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

153. *TETTIGONIA POLITA*, n. s. Ochracea subtus albido-flava, capite guttis septem thoraceque duabus atris, alis anticis nigris costâ testaceâ margine interiore ochraceo, posticis nigricantibus.

Ochraceous, whitish-yellow beneath. Head with seven black dots, three in front and four behind. Thorax with two black dots. Fore wings black; costa testaceous; interior border ochraceous. Hind wings blackish. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

154. *TETTIGONIA GLABRA*, n. s. Testacea, capite guttis duabus lateralibus

nigris, thorace fulvo, abdomine nigro, alis anticis cupreis, guttis duabus marginalibus testaceis, posticis nigro-cinereis.

Testaceous. Head with a minute black dot on each side near the eye. Thorax tawny. Abdomen black. Fore wings cupreous, shining, with two elongated testaceous dots; one on the costa, opposite to the other which is on the interior border. Hind wings blackish-grey. Length of the body $2\frac{3}{4}$ lines; of the wings 6 lines.

155. *TETTIGONIA INCLINANS*, n. s. Cuprea, capite pedibusque testaceis, capite subtùs vittis duabus rufis, abdomine nigro, alis posticis nigricantibus. Cupreous. Head testaceous; front with two red stripes. Abdomen black. Legs testaceous. Hind wings blackish. Length of the body $2\frac{3}{4}$ lines; of the wings 6 lines.

156. *TETTIGONIA DIFFICILIS*, n. s. Nigro-ænea subtùs testacea, capitis fasciâ interruptâ thoracis vittis duabus angulatis scutellique guttis ochraceis, pedibus testaceis, alis cinereo-hyalinis, anticis nigricante guttatis.

Blackish-æneous, testaceous beneath. Head with an interrupted ochraceous band. Scutum with an angular ochraceous stripe on each side; scutellum with ochraceous dots. Legs testaceous. Wings greyish-hyaline; fore wings with a blackish dot on each areolet. Length of the body 3 lines; of the wings 6 lines.

Coh. SCARIDES, *Amyot et Serv.*

Gen. LEDRA, *Fabr.*

157. *LEDRA TUBERCULIFRONS*, n. s., fœm. Ferruginosa, capite lato tuberculato, scuto quadricarinato, alis cinereo-subhyalinis, anticis ferrugineo variis tuberculis duobus nigris, areolis plurimis.

Female. Ferruginous, paler beneath. Head short-conical, tuberculated, slightly keeled, much broader than long, with a short oblique ridge on each side behind. Scutum transverse subquadrate, with four keels. Wings cinereous-hyaline; fore wings varied with ferruginous, slightly tuberculated at the base, and with two more distinct black tubercles in the disk; areolets irregular and very numerous. Length of the body 6 lines; of the wings 10 lines.

158. *LEDRA DILATIFRONS*, n. s., fœm. Obscurè ferruginea confertissimè punctata subtùs nigra, capite latissimo subtùs anticè testaceo, facie flavâ, scuto quadrirugoso, femoribus apice tibiisque albidis, alis posticis cinereis.

Female. Dark ferruginous, very thickly punctured, black beneath. Head and thorax with a slight middle keel. Head a little broader than the thorax, twice broader than long, very obtusely angular in front; disk on each side with an impression containing a black forked line; under side testaceous along the fore border; face yellow. Scutum more than twice broader than long, a little broader in front, with four broad ridges. Legs black; femora towards the tips, tibiae and posterior tarsi whitish. Fore wings with ridged veins. Hind wings cinereous. Length of the body 5 lines; of the wings 8 lines.

159. *LEDRA TENUIFRONS*, n. s., mas. Cervina albedo varia subtùs albido-testacea, capite transverso brevi-conico, angulis tribus anticis perobtusis, scuto anticè convexo maculis duabus lateralibus fuscis, scutello maculis duabus fuscis nitidis, abdomine suprâ pallidè luteo, alis hyalinis, anticis cervino-venosis basi cervinis punctulatis, posticis nigro-venosis.

Male. Fawn-colour, whitish testaceous beneath. Head and thorax partly whitish. Head very thin, with a slight keel, nearly twice broader than long, with three very obtuse angles in front. Scutum convex and with a brown spot on each side in front; scutellum with a brown shining spot on each side. Abdomen pale luteous above. Legs whitish. Fore wings hyaline, with fawn-coloured veins, fawn-coloured and punctured at the base. Hind wings with black veins. Length of the body $4\frac{1}{2}$ lines; of the wings 7 lines.

160. *LEDRA LONGIFRONS*, n. s., fœm. Ferruginea subtùs sordidè albido-testacea, capite thorace alisque anticis apud costam testaceo guttatis, capite longi-conico, scuto anticè convexo, abdomine longo, suturis chalybeo-albidis nitentibus, alis anticis vittâ discali apicibusque subhyalinis, posticis hyalinis nigro-venosis.

Female. Ferruginous, dingy whitish testaceous beneath. Head, thorax and fore wings along two-thirds of the costa with testaceous dots. Head elongate-conical, rather broader than long, with an almost obsolete keel. Scutum convex in front. Sutures of the abdomen chalybeous-white, shining; tip testaceous. Legs whitish. Fore wings with a discal stripe and with the apical third part nearly hyaline. Hind wings hyaline, with black veins. Length of the body 5 lines; of the wings 8 lines.

161. *LEDRA CONICIFRONS*, n. s. Pallidè fulva subtùs sordidè albido-testacea, capite thorace alisque anticis confertissimè punctulatis, capite conico, scuto anticè convexo, pedibus albidis, alis anticis testaceis, apicibus posticisque hyalinis.

Pale tawny, dingy whitish testaceous beneath. Head, thorax and fore wings along two-thirds of the length very thickly and minutely punctured. Head and scutum with an indistinct keel; head conical, a little shorter than that of the preceding species; scutum convex in front. Legs whitish. Fore wings testaceous, hyaline towards the tips; veins testaceous. Hind wings hyaline, with black veins. Length of the body $4\frac{1}{2}$ lines; of the wings 8 lines.

162. *LEDRA PLANIFRONS*, n. s., mas. Testaceo-viridis subobsoletè punctulata subtùs viridi-alba, capite scutoque ferrugineo marginatis, illo brevi, hujus lateribus angulatis, abdomine pallidè rufo, pedibus albidis, alis posticis albido-hyalinis venis albis.

Male. Testaceous-green, very minutely punctured, greenish-white beneath. Head and scutum with a ferruginous border. Head rounded in front, full thrice broader than long, indistinctly keeled. Scutum hardly convex in front, slightly concave behind, with a distinct angle on each side. Abdomen pale red. Legs whitish. Fore wings more green than the thorax. Hind wings whitish-hyaline, with white veins. Length of the body $4\frac{1}{2}$ lines; of the wings 8 lines.

163. *LEDRA ARCUTIFRONS*, n. s. Pallidè viridis subobsoletè punctulata subtùs albida, capite conico, scuto anticè non convexo posticè vix concavo, pedibus albidis, alis posticis albo-hyalinis venis albis.

Pale green, whitish beneath. Head and scutum with an almost obsolete furrow. Head conical, very much broader than long. Scutum not convex in front, very slightly concave behind. Legs whitish. Fore wings greyish towards the tips; hind wings whitish-hyaline, with white veins. Length of the body 4 lines; of the wings $7\frac{1}{2}$ lines.

164. *LEDRA RANIFRONS*, n. s., mas. Ferruginea, capite subtùs abdomineque rufis, thorace fasciâ posticâ viridi piceo marginatâ, pectore pedibusque testaceis, alis anticis fulvis, margine postico viridi strigâ exteriore fuscâ, posticis cinereis.

Male. Ferruginous. Head short-conical, much more than twice broader than long, red beneath. Scutum hardly convex in front, green along the hind border, and with an intermediate transverse piceous line. Pectus and legs testaceous. Abdomen red. Fore wings tawny, green along the hind border, and with a brown streak towards the tip which is paler. Hind wings cinereous, with black veins. Length of the body 3 lines; of the wings 6 lines.

165. *LEDRA OBTUSIFRONS*, n. s., fœm. Viridis lata subtùs testacea, capite brevi subtùs ferrugineo, scutello fusco, alis anticis lineâ basali aream pallidam includente fasciâque subapicali fuscis, posticis hyalinis nigro-venosis.

Female. Green, broad, testaceous beneath. Head much more than twice broader than long, rounded in front, ferruginous beneath. Scutum hardly convex in front and as little concave behind; scutellum brown. Fore wings with a brown basal line including a pale space along the hind border, and with a brown subapical band. Hind wings hyaline, with black veins. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

166. *LEDRA TRUNCATIFRONS*, n. s., mas. Picea lata punctulata subtùs nigra, capite perbrevis, abdomine basi pedibusque testaceis, alis anticis apice pallidioribus, posticis cinereis nigro-venosis.

Male. Piceous, broad, black beneath. Head, thorax and fore wings very minutely punctured. Head about four times broader than long. Scutum short. Abdomen at the base and legs testaceous. Fore wings paler at the tips. Hind wings greyish-hyaline, with black veins. Length of the body $1\frac{1}{2}$ line; of the wings 3 lines.

Gen. EPICLINES, *Amyot et Serv.*

167. *EPICLINES OBLIQUA*, n. s. Viridis subtùs testacea, capite conico, sento fasciis duabus anticis rufis posticè fusco, scutello et alarum anticarum margine postico basi vittâque discali obliquâ luteis, alis posticis cinereo-hyalinis nigro-venosis.

Green, testaceous beneath. Head conical, indistinctly keeled, nearly twice broader than long. Scutum obtusely angular on each side, with two red bands in front, brown along the hind border. Scutellum luteous. Fore wings luteous along the hind border towards the base, and with an oblique

luteous band which extends from the base of the costa to nearly two-thirds of the length of the hind border. Hind wings cinereous-hyaline, with black veins. Length of the body 7 lines; of the wings 14 lines.

Gen. ISACA, n. g.

Corpus breve. *Caput* transversum, convexum; frons transversa; facies transversa, trigona. *Antennæ* brevissimæ; arista gracillima, corporis dimidio longior. *Pedes* anteriores breves; postici longi, tibiis spinosissimis. *Alæ* sat angustæ, venis paucis.

Body short. Head transverse, convex; vertex short; front and face transverse, the latter triangular. *Antennæ* very short; arista very slender, more than half the length of the body. Anterior legs short; hind legs long; their tibiæ very spinose. Wings rather narrow, with few veins.

168. ISACA BIPARS, n. s. Nigra nitens glabra, facie pectore abdomine pedibusque albidis, alis hyalinis, anticis strigâ latâ basali fasciâque latissimâ exteriore nigro-fuscis, posticis disco nigro-fusco.

Black, shining, smooth. Face, pectus, abdomen and legs whitish. Wings hyaline. Fore wings with a broad blackish-brown basal streak, and with a very broad exterior blackish-brown band. Hind wings with a blackish-brown disk. Length of the body $1\frac{1}{2}$ line; of the wings 4 lines.

Coh. IASSIDES, *Amyot et Serv.*

Gen. ACOCEPHALUS, *Germar.*

169. Acocephalus olivaceus, *Walk.* See page 98.

170. Acocephalus stramineus, *Walk. Cat. Homopt.* pt. 3. 847. 2.

Inhabits also Java.

171. ACOCEPHALUS DISCIGUTTA, n. s., mas. Testacea brevis, abdominis dorso nigro, alis anticis albis fusco reticulatis, maculâ discali nigrâ, plagâ posticâ testaceâ, posticis hyalinis albo-venosis.

Male. Testaceous, short. Abdomen black above. Fore wings white, with brown transverse marks which are most frequent at the tips; a black discal spot and a posterior testaceous patch. Hind wings quite hyaline, with white veins. Length of the body $1\frac{1}{2}$ line; of the wings 3 lines.

Gen. CÆLIDIA, *Germar.*

172. CÆLIDIA DIRIGENS, n. s., fœm. Fusca subtùs alba, vertice albo anticè nigro, capite subtùs fasciis ferrugineis, scuto albo consperso, abdomine nigro-vario, tibiis tarsisque apice albis, alis anticis maculis nigris albisque, venis albo punctatis.

Female. Brown, white beneath. Vertex white, black along the fore border; front with three ferruginous bands. Scutum sprinkled with white. Abdomen varied with black. Tibiæ and tarsi with black tips. Fore wings slightly mottled, with black costal spots, and with white hyaline discal spots; veins with white dots. Length of the body $3\frac{1}{2}$ lines; of the wings 7 lines.

173. *CÆLIDIA PARDALIS*, n. s. Fulva subtùs testacea, fronte facieque vittis duabus rufis, alis anticis fuscis maculis variis luridis, posticis cinereis.

Tawny, testaceous beneath. Front and face with two red stripes. Fore wings brown, with lurid spots of various size and shape. Hind wings grey. Length of the body 3 lines; of the wings 6 lines.

174. *CÆLIDIA ALBISIGNA*, n. s. Nigra, capite albido, facie nigrâ, abdominis segmentis albido marginatis, tibiis anterioribus albidis, alis anticis nigro-fuscis, guttis plurimis luridis maculis quatuor marginalibus albis, posticis cinereis.

Black. Head whitish; face black. Segments of the abdomen with whitish borders. Tarsi whitish, with black tips; anterior tarsi whitish; hind tibiæ partly whitish. Fore wings with several lurid dots, with two irregular white spots on the costa, and with two more on the interior border. Hind wings grey. Length of the body $2\frac{1}{2}$ lines; of the wings 5 lines.

175. *CÆLIDIA CUPRARIA*, n. s., fem. Testacea, capite subtùs fulvo bivittato, pectore plagis quatuor nigris, alis anticis nigro-cupreis costâ testaceâ, posticis nigro-cinereis.

Female. Testaceous. Front and face with two tawny stripes. Pectus black; segments with testaceous borders. Legs tawny. Fore wings blackish-cupreous; costa testaceous. Hind wings blackish-grey. Length of the body 4 lines; of the wings 8 lines.

Gen. BYTHOSCOPIUS, *Germar.*

Group 1. *Arista brevis. Arista short.*

176. *Bythoscopus ferrugineus*, *Walk. Cat. Homopt.* pt. 3. 865. 31.

Inhabits also Java.

177. *BYTHOSCOPIUS TESTACEUS*, n. s., mas. Luteo-testaceus nitens subtùs pallidè testaceus, capite brevi, thorace subpunctulato, abdominis segmentis rufo marginatis apice rufo, alis anticis apice cinereo-hyalinis, posticis nigro-cupreis.

Male. Luteous-testaceous, shining, pale testaceous beneath. Head very little longer in the middle than on each side. Thorax very minutely punctured. Abdominal segments with red borders; tip red. Fore wings greyish-hyaline towards the tips. Hind wings blackish-cupreous. Length of the body 4 lines; of the wings 8 lines.

178. *BYTHOSCOPIUS METALLICUS*, n. s., fem. Cupreus subtùs ferrugineus, capite fulvo brevissimo latissimo, vertice scutoque anticè testaceis, illius margine antico nigro, alis anticis fasciâ maculâque exteriore discali albido-hyalinis, posticis nigro-cinereis.

Female. Cupreous; ferruginous beneath. Head tawny, very short and broad; vertex with a black line along the fore border which is testaceous. Scutum testaceous in front. Fore wings with a whitish-hyaline band, and with an exterior discal spot of the same hue. Hind wings blackish-grey. Length of the body $4\frac{1}{2}$ lines; of the wings 9 lines.

179. *BYTHOSCOPIUS LATERALIS*, n. s. Cupreus subtùs fulvus, capite brevi-

conico lineâ anticâ transversâ nigrâ, alis anticis apices versus cinerco-notatis, strigis duabus costalibus hyalinis, posticis nigro-cinereis.

Cupreous, tawny beneath. Head short-conical, rather longer than in most species of the genus; vertex with a transverse black line in front. Fore wings towards the tips with some cinereous marks and with two more distinct hyaline costal streaks. Hind wings blackish-grey. Length of the body 2 lines; of the wings 4 lines.

180. *BYTHOSCOPIUS CEPHALOTES*, n. s. Pallidè flavus, capitis disco testaceo, punctis duobus anticis nigris, strigis duabus subtùs facieque nigris, abdomine testaceo, alis anticis fulvis, margine postico basi pallidè flavo, posticis cinereo-hyalinis.

Pale yellow. Head testaceous in the disk above, with two minute black dots in front, and with two black streaks towards the face, which is also black. Abdomen testaceous. Fore wings tawny, pale yellow at the base of the hind border. Hind wings greyish-hyaline. Length of the body $1\frac{1}{2}$ line; of the wings 3 lines.

Group 2. *Arista perlonga. Arista very long.*

181. *BYTHOSCOPIUS BIARCVATUS*, n. s., fem. Albido-testaceus, vertice scuto-que lineâ transversâ arcuatâ rufâ, alis anticis maculis duabus costalibus exterioribus apiceque fuscis, posticis subhyalinis pallido-venosis.

Female. Whitish-testaceous. Head arched, about four times broader than long, a little more convex in front than concave behind. Vertex and scutum each with a transverse red arched line. Arista about three-fourths of the length of the body. Fore wings with brown tips, and with two exterior brown costal spots. Hind wings nearly hyaline, with brown tips. Length of the body $2\frac{1}{2}$ lines; of the wings $5\frac{1}{2}$ lines.

182. *BYTHOSCOPIUS LETISIGNA*, n. s., mas. et fem. Cinereo-cupreus subtùs cinereus, capitis lineâ anticâ thoracis fasciâ anticâ interruptâ arcuatâ maculisque posticis ochraceis, tibiis anticis ochraceis, alis cupreo-hyalinis, anticis costâ ochraceâ maculis duabus exterioribus costalibus apiceque nigro-fuscis.

Male and Female. Cupreous, with a cinereous tinge; cinereous beneath. Head with an ochraceous line in front of the vertex. Arista about half the length of the body. Thorax with an arched interrupted ochraceous band and some hinder ochraceous spots. Fore tibiæ and tips of the fore femora ochraceous. Wings cupreous-hyaline. Fore wings with the costa and the interior border ochraceous, with two exterior blackish-brown costal lines, with blackish-brown tips, and with a blackish-brown dot by the interior border. Length of the body 3 lines; of the wings 7 lines.

183. *BYTHOSCOPIUS NIGRILINEA*, n. s. Æneo-fulvus, capite lineis duabus transversis nigris, alis anticis æneo-luridis, guttis tribus apud marginem posticum nigris.

Æneous-tawny. Head with two black transverse lines. Arista a little more than half the length of the body. Wings lurid, with an æneous tinge; interior border of the fore wings with three black dots. Length of the body $2\frac{1}{2}$ lines; of the wings 6 lines.

184. *BYTHOSCOPIUS IGNICANS*, n. s. Ochraceus subtus testaceus, scutello albo, alis anticis guttis discalibus maculisque marginalibus albis, maculis apicalibus fuscis, posticis cinereis.

Ochraceous, testaceous beneath. Arista longer than the body. Scutellum white. Legs testaceous. Fore wings with white brown-bordered discal dots, and with some white spots on the costa and on the interior border; disks of the exterior areolets brown. Hind wings grey. Length of the body $1\frac{3}{4}$ line; of the wings 4 lines.

DESCRIPTION OF PLATE VI., illustrating New Genera of Bornean *Diptera*, described in Mr. WALKER's Memoir, pp. 105-136.

PLATE VI.

- Fig. 1. *Culeua simulans*, magnified, p. 109: 1 *a*, the head seen sideways; 1 *b*, the antenna more strongly magnified.
 Fig. 2. *Evaza bipars*, magnified, p. 109: 2 *a*, the head seen sideways, showing the large facets of the eyes; 2 *b*, the antenna.
 Fig. 3. *Citibana aurata*, magnified, p. 124, showing the spinose posterior femora: 3 *a*, the head seen in front; 3 *b*, the same seen sideways; 3 *c*, the antenna.
 Fig. 4. *Baryterocera inclusa*, magnified, p. 123: 4 *a*, the head seen sideways; 4 *b*, the same seen in front; 4 *c*, the antenna.
 Fig. 5. *Gauzanina delecta*, magnified, p. 130, showing the large middle legs: 5 *a*, the head seen in front; 5 *b*, the same seen sideways; 5 *c*, the antenna.

ILLUSTRATIVE DESCRIPTION OF PLATES VII. & VIII. of Bornean *Homoptera*, described in the foregoing Paper.

PLATE VII.

- Fig. 1. *Leusaba marginalis*, p. 144: 1 *a*, the head and prothorax seen sideways.
 Fig. 2. *Isporisa apicalis*, p. 145: 2 *a*, the head and prothorax seen sideways.
 Fig. 3. *Epora subtilis*, p. 146: 3 *a*, the head and prothorax seen sideways.
 Fig. 4. *Ostama juncta*, p. 151: 4 *a*, upper wing; 4 *b*, face seen in front.
 Fig. 5. *Erana operosa*, p. 151: 5 *a*, upper wing; 5 *b*, face seen in front.
 Fig. 6. *Rhotala delineata*, p. 152: 6 *a*, the head and prothorax seen sideways.
 Fig. 7. *Hiracia ignava*, p. 155: 7 *a*, the head and prothorax seen sideways; 7 *b*, the fore and hind wings expanded.
 Fig. 8. *Lerida fervens*, p. 158: 8 *a*, head and prothorax seen sideways.

PLATE VIII.

- Fig. 1. *Paricana dilatipennis*, p. 159: 1 *a*, head and prothorax seen sideways.
 Fig. 2. *Rhotana latipennis*, p. 160: 2 *a*, head and prothorax seen sideways.
 Fig. 3. *Eucarpia univittata*, p. 159: 3 *a*, head and prothorax seen sideways.
 Fig. 4. *Ficarasa pallida*, p. 162: 4 *a*, head and prothorax seen sideways.
 Fig. 5. *Nicerta submentiens*, p. 159: 5 *a*, head and prothorax seen sideways; 5 *b*, hind leg.
 Fig. 6. *Amarusa picea*, p. 166: 6 *a*, face seen in front.
 Fig. 7. *Isaca bipars*, p. 172: 7 *a*, face seen in front.

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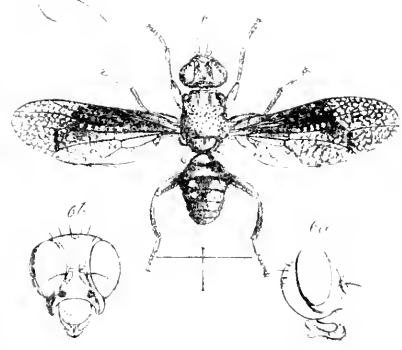
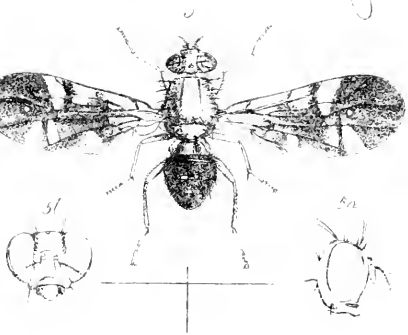
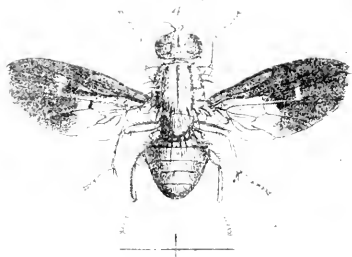
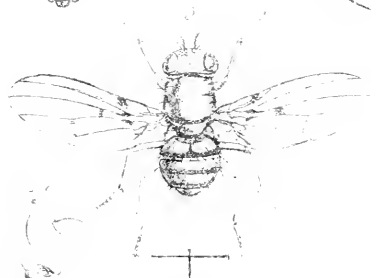
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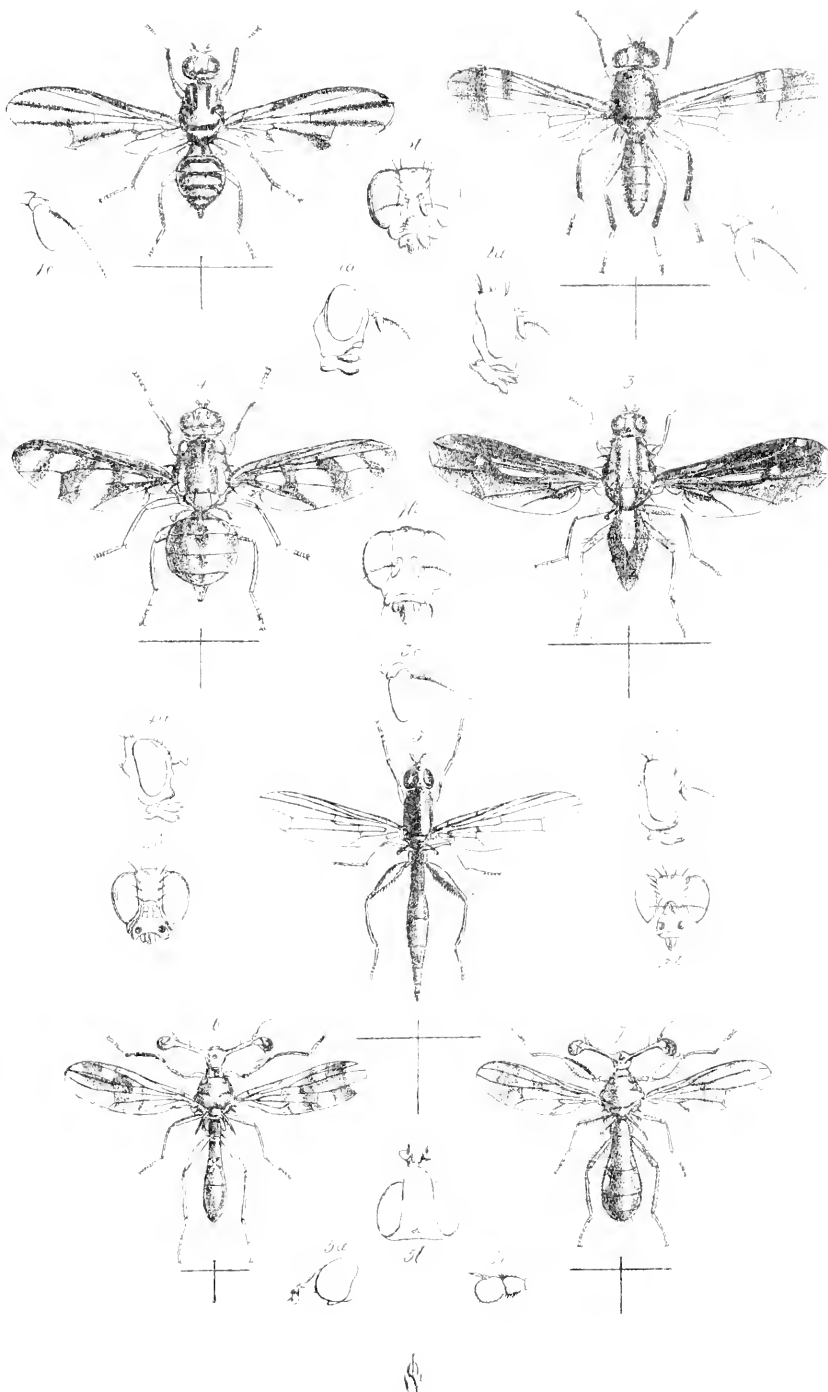
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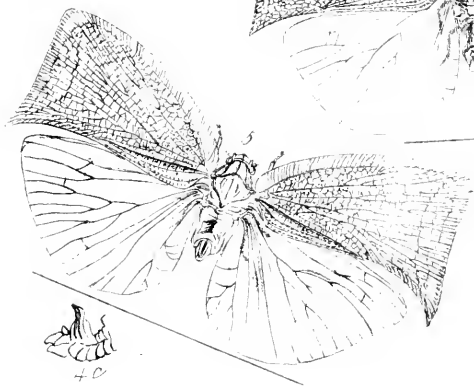
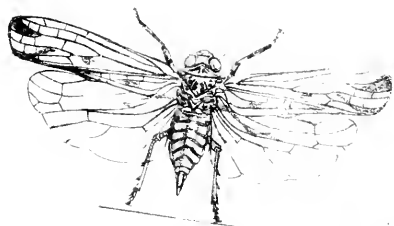
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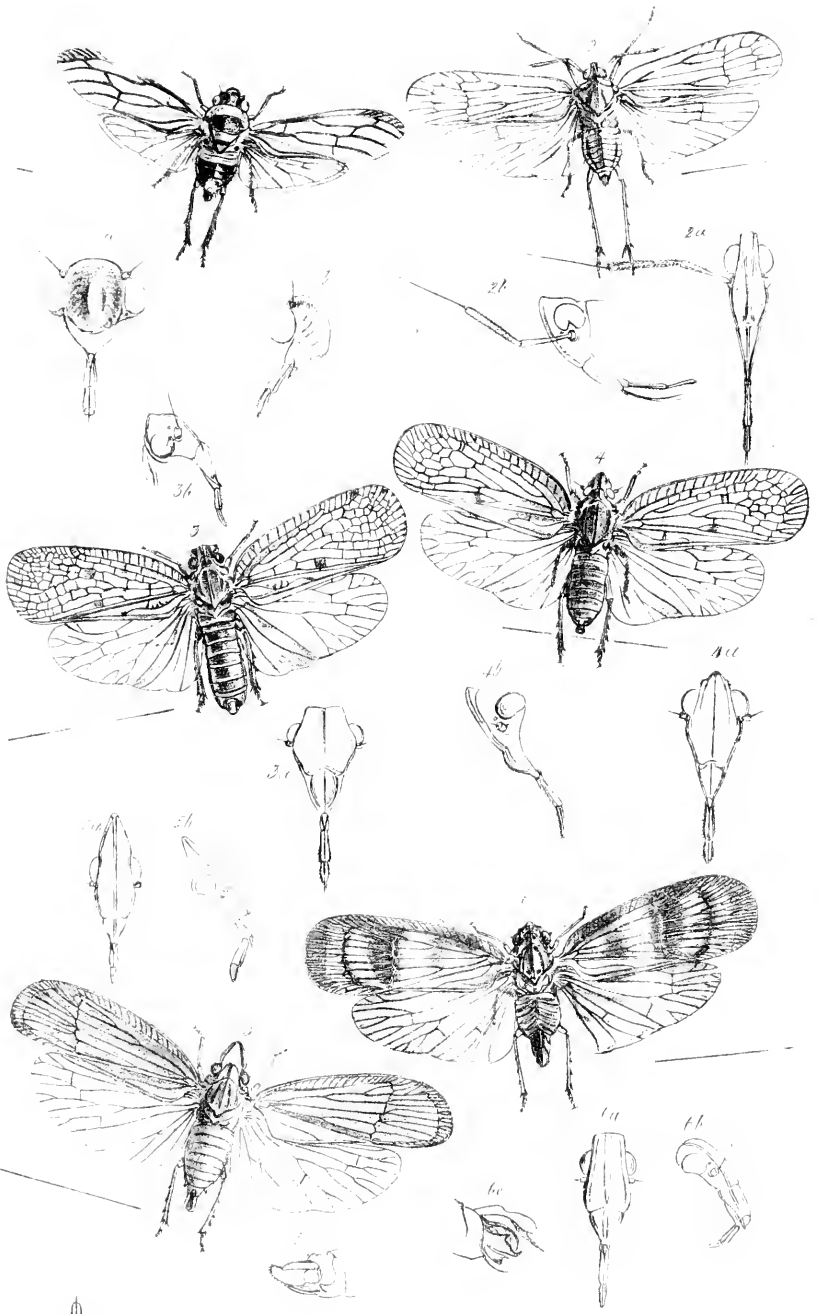
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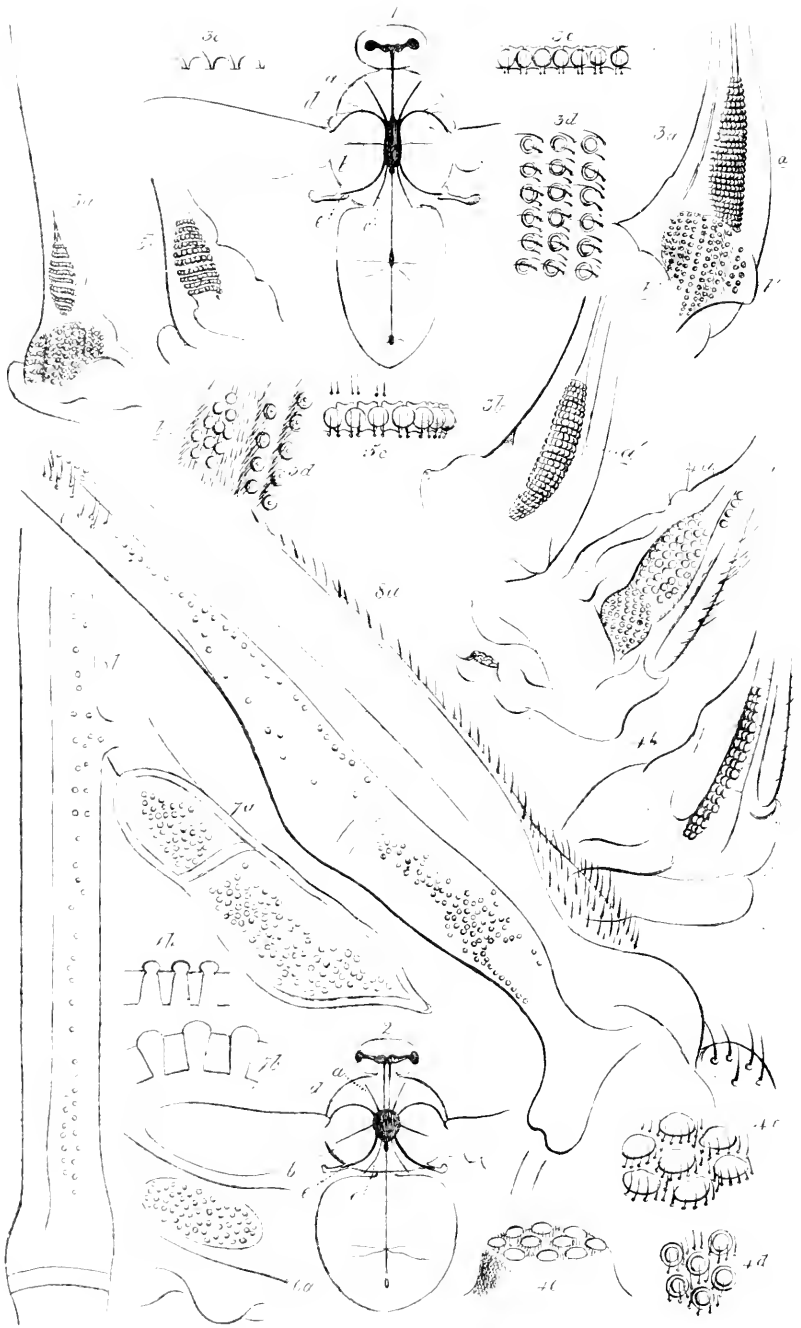
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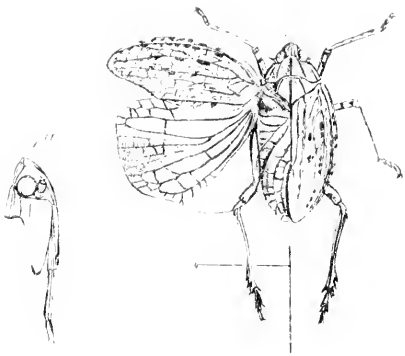
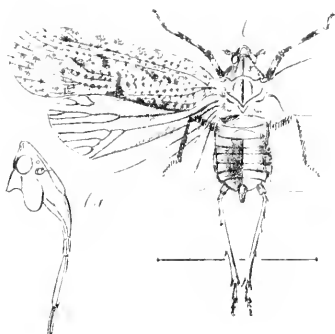
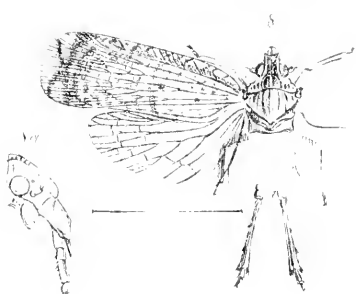
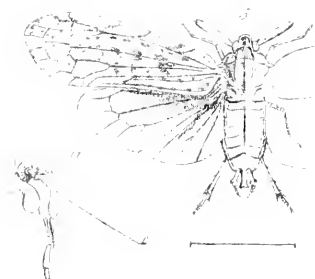
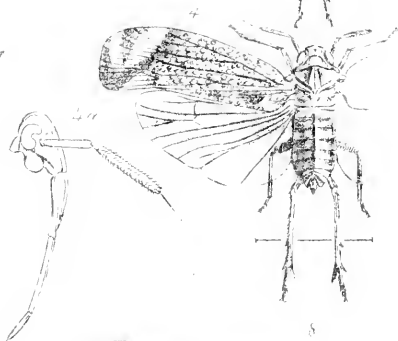
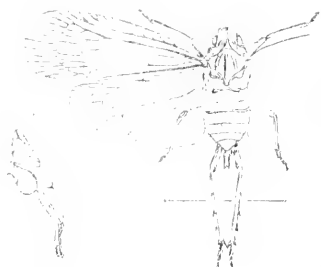
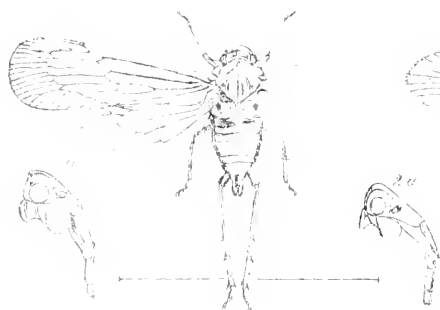


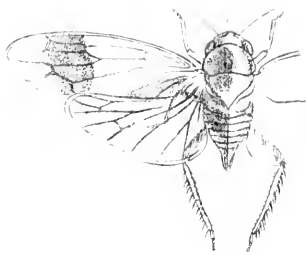
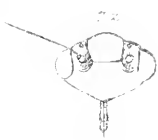
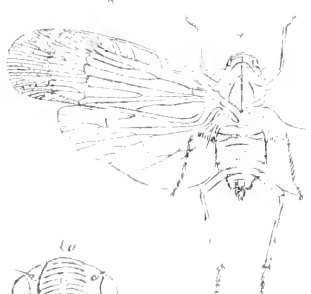
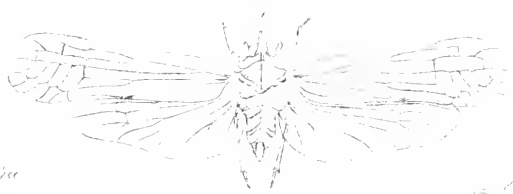














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